tony Hoe 10. 1. 7. 21
134. 9. 29.

THE WELL-SPRING OF SCIENCES.

TEACHING

The perfect worke and practise of ARITHMETICK, both in Numbers and Fractions: set forth

BY

HVMFREY BAKER, *Londoner*.

And now againe perused, augmented, and amended in all the three parts by the said Author.

Whereunto are also added certaine Tables of the agreement of Measures and Weights of divers places in EVROPE the one with the other, as by the Table appeareth.

LONDON,

Printed by *M. F.* for *Christopher Meredith* at the signe of the Crane in Pauls Church-yard. 1646.

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To the right Worshipfull the

Governors, Assistants and the rest of the Company of Merchants adventurers: *Humfrey Baker* Londoner, wisheth health with continuall increase of commodity by their worthy travail.

IF the knowledge of Arithmeticke, right worshipfull, were of so small profit in the life of man, or so little used in our worldly affaires, that it might bee well left, or but seldome frequented, it were wel done by the professors thereof, to pen very long and eloquent Orations, in setting forth the commendation of the same. But since experience hath taught to be true the old proverb: That where good wine is to sell, there need no garland be hanged out, me thinketh they doe great injury unto Arithmetick, that seek to heare the commodities thereof set forth in a short Epistle, and surely they overcharge me in laying such a burthen on my back as were too importable for the greatest Oratour. For the skill hereof is well knowne, immediatly to have flowed from the wisedome of GOD, into the heart of man, whom he hath created the chiefe Image and instrument of his prayse and glory, revealing himselfe unto him so farre as he judged convenient, whom notwithstanding he could not conceive to remaine in the most secret mystery of Trinity in Unity, were it not by

the benefit of most divine skill in numbers, which skill as also the most full and effectuall knowledge of all other things unspeakeable, GOD used in his wonderfull Creation of all the world out of nothing, which hee accomplished within the compasse of certaine number of days, expressing moreover, what hee made in every day, and of certaine his creatures how many he made, as appeareth in the Book of Genesis, written by speciall Revelation of the holy Ghost, wherein the divine Majesty of GOD could not be known unto us without the knowledge of numbers, nor *Moses* have understood what himselfe had written. And *Salomon* the wisest man that ever was, considering the very depth of all things within his mind, to whom God had given a greater gift of wisedome, then to any man either before or since, doubted not to break forth in these words, saying; Thou O Lord hast disposed all things in measure, number and weight for thus it pleased him to judge who in an other place testifieth how that hee hath searched deeper into the causes and knowledge of all things, then any other man in the world.

These testimonies (right Worshipfull) doe manifestly teach us, what wee ought to thinke of the cause, and originall of Arithmetick, and partly also how necessary it is in the life of man, that unlesse by nature, wee have some feeling and understanding therein, wee are no better then Beasts, and in this respect worse, for that we retain not that whereunto we are as specially borne, as naturally they doe, some to running

some

ſome to ſmelling, ſome to hearing, ſome to flying and ſome to ſwimming, Take away Arithmeticke, wherein differeth the Shepheard from the ſheepe, or the horſe-keeper from the Aſſe? Surely but onely iu ſhape and figure, which as the learned affirme, is a very ſlender cauſe of difference. Wherefore not without juſt cauſe have the ancient Fathers, and Philoſophers ſingularly extolled the knowledge of Arithmetick, diligently training up their youth therein, as in a ſcience moſt neceſſary of it ſelfe, conſidering the deepe deviſes, the profound practiſes, and cunning concluſions therein contayned: and alſo that it is the Key and entrance into all other arts and learning: as well approved the Noble Philoſopher *Pythagoras*, who cauſed this inſcription to be written upon his ſchoole doore (where he taught philoſophy) in great Letters, *Nemo Arithmeticæ ignarus hic ingrediatur:* Let none enter here, that is ignorant in Arithmetick: which ſaying, as it is proper and peculiar unto all ſorts of men in the beginning and entrance into all liberall knowledge and Faculties to bee enſued and embraced, ſo ſurely above all other it is, next after the word of GOD, moſt fit and neceſſary that it ſhould be written upon your ſchoole doores, right Worſhipfull, whoſe trade and travail is imployed in the Noble traffique of Merchandiſe, wherein you have need of continuall recourſe unto this excellent art. The daily exerciſe whereof, hath ſo ſharpened your judgments, and ripened your underſtandings, that moſt of you are become ſingular therein, both to deale that way your ſelves, and to judge

of other mens doings. And herein I am sure you are good witnesses with mee how foolish and vain is their opinion which beside your most commendable affairs, suppose and affirme that Arithmetick is of small use unto any other men, seeing that the Laws of sundrie Realmes well instituted and guided, have deservedly accompted for fooles, and unfit members, (to rule or deale in a common wealth) all such as wanted the skill of naturall Arithmetick, deprived them both of Lands and living: which as it tendeth to no small prayse and credit of Arithmetick, so am I constrained for brevity sake in few words to overpasse both that and others which might bee said in commendation thereof. Shortly admonishing your Worships, that whereas in times past, as is well knowne, I had travailed in a Booke in English of that Faculty dedicated unto you; being now enforced to runne over the same, both amending and augmenting it with sundry Additions: I am so bold againe to attempt your Worships with the acceptation therof, hoping that as in foretime ye have taken it such as it was, yee will now also daigne to receive it, being in better case (I hope) then ever it was, a token of my good will, howbeit a simple thing, wherein you may weigh the heart and not the gift, proceeding from such a Fountaine, that if better skill and knowledge had beene matched to my good meaning, it should have been done otherwise to the better contentation of your worthinesse. And therfore in the mean season untill it please GOD to furnish me in such sort, I rest in dayly prayer

unto him, to maintaine your Fellowship in happy estate, and to blesse your purposes with lucky successe, to guide your viages with wished increase, and to season your doings with all kind of vertue, and to preserve your lives with desired health to his will and pleasure.

TO THE READER.

HAving (gentle reader) published in print one English booke of Arithmetick contayning as I suppose, sundry profitable documents for such as desire any knowledge therein, I have been often since that time, and of very late also, requested by sundry of my friends, to peruse the same work, and as I should now judge it expedient, to add something more thereunto, and to amplifie the same. Which earnest and friendly suite of theirs, for certaine iust causes seeming needful unto me, surely I could in no wise deny. For when I perceived the importunity of certaine strangers, not borne within this Land, at this present, and of late days, so far proceeding, that they advanced and extolled themselves in open talke and writings, that they had attained such knowledge and perfection in Arithmeticke, as no English man the like. Truly mee thought that the same report not only tended to the dispraise of our Countrimen in generall, but touched especially some others & me, that had travailed and written publickly in the same faculty. For unto this same effect they have of late painted the corners and posts in every place within this City with their peevish bills, making promise and bearing men in hand that they could teach the summe of that science in brief Method and compendious rules, such as before their arrivall, have not beene taught within this Realme. Whose sayings to be false, and writings untrue, if I were therto

required by men of authority I am well able to prove; and that more is (be it ſpoken without envy, or thirſt of praiſe) even within this ſame book, if it may pleaſe thee to make triall, are generall precepts & rules to be found, ſuch as they can bring forth neither briefer nor better. But this is no rare thing, ſince in other matters of greater importance, their attempts are too too perilous, and their deeds outragious, well deſerving reſtraint and baniſhment, againſt one of whom, verily not of mine owne accord, but conſtrainedly, I have beene enforced to ſharpen my pen, for that he, as I heare ſay, continueth in diſpraiſe of our Nation, ſaying, that we are unskilful in thoſe rules that he teacheth, and himſelf excellent in the knowledge of Arithmetick: wherin if true triall might be indifferent Iudge, I doubt not but he would be found to have leaſt skill of a great many: of whom perhaps, if I ſhould write upon report of others, I could ſay ſomewhat more, which would (if it were true, and he knowne) redound unto his utter diſcredit, which for this cauſe I omit to doe, leaſt the crime of arrogancy might be thought to reſt within me, which I object againſt him; howbeit, thus much I dare affirme, that there are divers in this honorable City, who although they advance and extoll not themſelves (ſo malepertly) as theſe ſort of men are accuſtomed to doe in all that they profeſſe, yet doe farre ſurpaſſe them, aſwell in the knowledge of numbers as in all other kind of learning and skilfulnes. Another cauſe alſo there is of this preſent Edition, as it ſeemeth to me very juſt and neceſſary, for when a certaine welwiller of mine purpoſing to imploy ſome time in bettering his knowledge in arithmeticke through the reading of this preſent booke, did certify me, that he in peruſing the ſame had eſpied ſo many errors committed in the printing, that he could gather no truth thereby. I was not a little moved thereat, ſince

that

hat by the diſordering thereof, neither the worke re-
ained his true meaning, neither could the learner at-
aine his deſired knowledge: and ſurely no marvaile,
or I am credibly informed, ſince it paſſed out of my
ands, it hath been often times printed without the
iew of a skilfull correƈtor, unto the great diſcredit of
he Author. Theſe and ſuch like conſiderations, urg-
ng me forward, and not forgetting the fruit, loving
Reader, that may grow unto thee hereby: I have taken
n hand both to amend and to augment the ſame,
ſeaſoning (as it were afreſh) all three parts of the work
with divers queſtions and examples, very neceſſary
and profitable; having alſo for thy commodity added
unto the end of this booke divers and ſundry tables of
the agreement of meaſures and weights of ſundry pla-
ces reduced to an equality the one to the other. Vnto
thee therefore my requeſt is, thankfully to accept the
ſame, and in good part, wiſhing well to him that tra-
vaileth for thy benefit, not diſdaining it in reſpeƈt of
groſſenes of the ſtyle, or rudenes of utterance, ſince
that this ſcience requireth not eloquence of writing,
but plainneſſe of teaching, and truth in working of di-
vers concluſions by numbers onely, deſiring thee, if
thou be willing to profit hereby, firſt friendly to a-
mend the faults that have eſcaped in the printing of
the ſame, and then to begin at the entrance of the
booke, and ſo orderly proceeding forward unto the
end, not turning unto the middeſt or laſt part thereof
untill thou perceiveſt well that which went before;
and ſo doing, thou ſhalt not onely attain to the per-
fit knowledge of the whole effeƈt; but be able alſo by
thine owne labour and induſtry to underſtand all o-
ther bookes of Arithmeticke, whatſoever: and thus I
bid thee farewell heartily.

AN

An advertisement touching this Edition Printed 1646.

THe friendly Reader may please to take notice that in this impression of 1646. the whole booke hath beene revised, every question therein examined, the faults that were commited in former impressions corrected, the whole restored to its first integrity. The Tables of weights and measures at the end of the Booke according to the Authors supposition, that is, as they are all compared with the weights and measures of London, with much labour examined: The fractions which before were in the common way (and so the figure being small in many not discerned) are put into the decimal parts, and so the same with the integrall, but far more true then the common fractions can expresse it in one figure, and if in the common it be exprest in many (as it must bee if true) then the decimall is far more easie, because the denominator is one and the same to all, wheras the other is differing.

I shal not need to add any thing in praise of the Book, the many impressions that have been made thereof may save me that labour; the taske I vndertooke was to correct what was amisse, which I have done with all faithfulnes, and so commend it to thy friendly acceptance. Farewell.

The

The definition of Number.

Number is as much to ſay as a multitude compoſed of many unites, as two is compoſed of two units, three is compoſed of three units, foure of foure units, five of five units, ten of ten, fourteene of fourteene, fifteene of fifteene, twenty of twenty units, &c.

And therefore an unite is no number, but the beginning and originall of number, as if you doe multiply or divide an unite by it ſelfe, it is reſolved into it ſelfe without any increaſe. But it is in number otherwiſe, for there can be no number, how great ſo ever it bee, but that it may continually bee increaſed by adding evermore one unite unto the ſame.

Numeration.

Chap. 1.

Numeration is the art whereby to expreſſe and declare the value of any ſum propoſed: & is of two kinds, the one gathereth the value of a ſum propoſed, & the other expreſſeth any ſum conceived by due figures & places, for the value is one thing, and the figures are another thing: and that com-

meth partly by the diversity of figures, but chiefly of the places wherin they be orderly set. And therefore you must first marke, that there are but ten figures or characters which are used in arithmetick, whereof nine of them are called signifying figures, and the tenth is called a Ciphar, which is made like an o, and of it selfe signifieth nothing, but if it be joyned with any of the other figures, it encreaseth their value, and these be they.

1	2	3	4	5	6
one,	two,	three,	foure,	five,	sixe,

7	8	9	0.
seven,	eight,	nine,	a ciphar.

Also you shall understand that every one of these figures hath two values: One is alway certaine and hath his signification of his owne forme, and the other is uncertaine which he taketh of his place.

A Place.

A place is called the seate or roome that a figure standeth in, and how many figures soever are written in one summe, so many places hath the whole value thereof: And that is called the first place (which is next toward the right hand) of any summe, and so reckoning by order toward the left hand, so that that place is last, which is next the left hand. And contrariwise, when you ex-

presse

presse the value of the figures in any sum, you must begin at the left hand, and so reckon toward the right hand.

Every of these nine figures, (which are called signifying figures) hath his owne simple value when hee is found alone, or in the first place of any summe. In the second place toward the left hand, he betokeneth his owne value ten times. As 70 is seven times ten: that is to say, seventy. 80 is eight times 10, that is, to say, eighty. In the third place every figure betokeneth his owne value a hundreth times. As 700, in that third place betokeneth a hundreth times 7, that is to say, seven hundred. In the fourth place every figure betokeneth his owne value a thousand times. As 7000 is seven thousand, and 8000 is eight thousand. These four first places must be had perfectly in mind, yea and that by heart, as they say, for by the knowledge of them you may expresse all kind of numbers how great soever they be.

In the fift place every figure betokeneth his owne value ten thousand times. As 70000, is ten times seven thousand, that is to say, seventy thousand. In the sixt place every figure standeth for his owne value, a hundreth M. times. As 700000, is seven hundreth thousand. The seventh

place,

place, M, M, times, or a millio. As 7000000 is seven M, M, or seven millions. And the eight place ten M M, times, or ten millions: so that every place toward the left hand, exceedeth the former ten times. But now for the easie reading, & ready expressing orderly of any summe proposed, you shall practise this manner following. And for example I propone this number 765432658, in the which are ix places. In the first place is 8 and betokeneth but eight, that is to say, once his owne value; in the second place is 5, and betokeneth ten times five, that is fifty: in the third place is 6 and betokeneth a hundreth times sixe, that is viC. In the fourth place is 2. and that is two M. and 3, in the fift place, is ten M times 3, that is xxx M. So 4 in the sixt place is C, thousand times 4, that is foure C, M. then 5, in the seventh place is a M M, times 5: that is five M, M. or rather five millions. And 6, in the eight place, is six times ten millions, that is lx. millions. And last of all vii in the ix place, is vii C millions. Now followeth the practise. First put a prick over the fourth figure, and so over the seventh, and likewise over the tenth. And also over the 13, 16, or 19. if you have so many, and so still leaving two figures between every two pricks

These rooms from one prick to another are called Ternaries, then you must pronounce every three figures from one prick to another as though they were written alone frō the rest. And at the end of their value, adde so many times a thousand, as your number hath pricks: (that is to say, if there be but 1 prick it is but 1 M: if two prickes, one M. M: or else a million: if three pricks, one M. M. M, or a M millions: and so consequently of all other figures following). Then come likewise to the next 3 figures, and sound them as if they were a part from the rest, and adde to their value so many times thousands as there are prickes betweene them, and the first place of your whole number. And so doe by the next 3 figures following, and all the rest likewise: as in example 4 5 1 2 3 4 6 7 8 5 6 7, The first pricke is over 8, in the fourth place, which is the place of a M. the second prick is over 4, in the seventh place, which is the place of a M. M, or one million: the third prick is over the tenth place, which is the place of a M. M. M or of a M, millions, as in the former example. Then for the expressing of this number by the value of every figure, according to the place wherin they stand, you shall first begin at the last prick over 1 and take Ternaries.

take it and the other two figures 5 and 4 which are behind the ſayd 1 toward your left hand: and value them alone and they are foure Cli, M M M, or elſe CCCCli. M millions: Then take the other three figures from 1 to the next prick toward your right hand, and value them as if they were apart from the other, and they are 234 which do ſignify, CCxxxiiii, millions or 234 M M. Then come to the third prick over 8. and take the other two figures behind it, and reckon them likewiſe as if they were alone, and they are ſix Clxxviii M. And laſt of all come to the other three figures which remain, that is 567: and they are five Clxvii. Thus the whole ſumme of theſe figures, is foure Cli M, two Cxxxiiii millions, ſixe Clxxviii M. five Clxvii, as was before.

Three kinds of number.

Note alſo that whole number is divided into three kinds, that is to ſay, digit number, article number, and mixt or compound number. The digit number, is all manner of numbers under ten, which are theſe nine figures, 1, 2, 3, 4, 5, 6, 7, 8, 9. of the which I have ſpoken before. The Article number is any kind which hath in the firſt place a Ciphar, as this 0. and they may ever bee divided iuſt by 10. without any remaine, as theſe, 10, 20, 30, 40,

Digit.

Article.

50,

50, 100, and all other ſuch like. The mixt or compound number containeth divers many articles, or at the leaſt one article, & a digit, as 11.12,16,19,22,38,108,1007, and ſo forth. And as any article number may be made a compound, by putting therto a digit, even ſo likewiſe every compound number, may be made an Article number by adding thereunto a 0. Mixt or compound.

¶ And heere followeth a briefe rehearſall of the order and Denominatours of the places. And this ſhall be ſufficient for Numeration.

The order of the places.		*The denominatours of the places.*
Tenth.	4	M. of Millions.
Ninth.	3	C. of Millions.
Eyght.	2	X. of Millions.
Seventh.	1	Millions.
Sixt.	0	C. of Thouſands.
Fifth.	1	X. Thouſands.
Fourth.	8	Thouſands.
Third place.	3	Hundreds.
Second place.	4	Tenths.
Firſt place.	5	Units.

Addition in whole number. Chap 2.

ADdition is as much as to bring together two ſumms or more into one, as if there were due to any man 223 li. by ſome one body: and 334 li. by another, and 431 by another: and you would know how many pounds is due to the ſame man in all, theſe three ſummes ſhall you ſet downe orderly the one under the other, writing the greateſt ſumme higheſt, and the next to the greateſt under it, and the leaſt ſumme under the laſt, in ſuch ſort that the firſt figure of the one ſumme toward your right hand be directly under the firſt figure of the other, and the ſecond under the ſecond, and ſo forth in order. When you have thus done, draw under them a ſtraight line, and then will they ſtand thus.

43
33
22

Now begin alwayes at the firſt places toward your right hand, and put together the three firſt figures of the firſt places of theſe three ſummes, and looke what commeth of them, and write that under them beneath the line

as

as in ſaying 3, 4, and 1. being put together doe make 8: write 8 under three, as here you ſee.

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431
334
223
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  8
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And then goe to the ſecond places of figures, & doe likewiſe: as in ſaying 2, 3, and 3, make 8, write 8 under 2 as here you ſee.

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431
334
223
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 88
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And doe likewiſe with the figures that bee in the third place, in ſaying 2, 3, and 4 are 9, put nine under them, and ſo will your whole ſumme appeare thus: whereby you may perceive that theſe three ſummes being added together doe make 988 li. And this is the art of Addition according to his ſimplicity, when the ſumme of any place doth not exceed a digit number. But in caſe the ſum of any one place cannot be expreſſed by one figure, but by two, you ſhall put the firſt of thoſe figures under the line, and keepe the other in your minde, for to adde it unto the firſt figure of the next place. And if the ſame next place cannot be avalued but by two figures, you muſt in like manner put the firſt of thoſe figures under the line, and reſerve the ſecond for the other place next

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431
334
223
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988
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after, and thus must you doe from one place to another untill you have come to the last place, where if it happen you doe find that the summe be of two figures, you must set them both downe because it is the end of that work, as in this example.

734682456
450932345
13467891
4672123
1203754815

Where the first figures are 3, 1, 5, 6. which added together maketh 15 and for that, that 15 is of two figures, I doe put the first figure 5, under the line, and keepe the second figure (which is 1) in my mind, the which I must add with the next figures of the second place, that is to say, with 2, 9, 4 and 5: the which together make 21. I write 1 under the line for the second figure of that addition, that is to say, after 5, and I keep 2, to be added unto the third place, the which with the other figures 1, 8, 3 and 4, doe make 18: therefore I put 8 next after 1 in the third place under the line, and keep 1 to be added unto the figures of the fourth place, which is with 2, 7, 2, 2. the which with the 1 that I keep, doe make 14: I set downe

4 for

4, for the fourth figure (under the line) that is to say, behind 8: and I keepe 1 to be added unto the figures of the fifth place which are 7, 6, 3, and 8, the which with the 1, that I keepe, make 25: I put 5 the fift place, under the line next after 4: and I keepe 2 in my mind, to be added with the figures of the sixt place, that is with 6, 4, 9 and 6 and that 2, which I kept maketh 27: I write downe 7, under the line in the sixt place, and I keepe 2 which I adde with the figures in the seventh place, and they make 13: I put downe 3 under the line in the seventh place, and adde 1 to the figures in the eight place, and they are 10: I doe put 0 under the line in the eight place, and then I adde 1 unto the ninth place, that is to say with 4, and seven, and they make 12: the which 12 I write at length under the line because it is the end of this addition, and thus is to be done of all such like. And for the easier understanding of that which we have spoken of addition, you may examine these two other examples following in the which the first hath these numbers, 3570, 2763, 579, and 28: which being added together, doe make this number 6940, and in the second example, doth result this number 51683, by adding together of these

numbers 47630,3756,272,25, as here under written.

The numbers to be added,	3570	47630
	2763	3756
	579	272
The line put between.	28	25
The summe of this addition.	6940	51683

Addition of l.s.d.

But if I have any summes which are composed of divers kinds of denominations, as 25 li.17 s,4 d. and 14 l,13 s,8 d, and 16 l, 19 s,7 d, to be added together, I must first set downe all the sayd summes the one under the other, as here you see: placing the title of pounds right under the pounds, the shillings under the shillings and the pẽce under the pence keeping likewise the due order of their places, in each denomination.

li.	s.	d.
25.	17.	4.
14.	13.	8.
16.	19.	7.
57.	10.	7.

And then I begin at the least denomination, which are penies: And I say thus: 4, and 8 make 12, & 7 make 19 d: that is, 1 s and 7 d, I set downe 7 under the line against the place of penies, and I doe keep in

in my mind 1 s, to be added unto the place of shillings. This done, I proceed to the sayd place of shillings, saying, 1 s. that I keepe and 7 s, are 8, and 3 are 11, and 9 doe make 20: I put o under the line against 9, and keepe 2 in my mind: Comming then unto the tens of shillings, I say 2 that I keepe, and 1 make 3, and 1 make 4, and 1 make 5: which are 5 tens of shillings, that is to say 2 l. & 1 ten over, the which 1 I put behind the o towards my left hand under the tens of shillings, and I doe keepe two li. in my mind, then I come to the place of pounds and say 2 li. that I keepe, and 5 are 7, and 4 are 11, and 6 do make 17 li: I do set 7 li. under the line against 6, and doe keepe 1 in my mind then comming unto the tens of pounds, I say 1 that I keepe and 2 are 3, and 1 are 4, and 1 doe make 5: the which 5 I write downe under the line behind the 7, and so is this addition ended: And then the said three summes being added together doe amount to 57 li, 10 s, 7 d. And thus is to bee done of all other summes, of any other denominations.

Other Examples.

225.	12.	6.	5678.	13.	9.
47.	3.	9.	608.	00.	10
38.	18	7.	400.	17.	11.
5.	00.	8.	56.	18.	8.
316.	15.	6.	9.	12.	7.
			6754.	03.	09.

Of Subſtraction in whole number.
The 3. Chapter.

SUbſtraction teacheth how you ſhall ſubſtract one leſſer number from a greater, and ſheweth what there doth remaine after that you ſhall have ſubſtracted the ſame, I ſpeak not of the ſubſtracting of one equall number, from another equall unto it, for the facility thereof requireth no rule.

In ſubſtraction are found three numbers, the one is the number from which the ſubſtraction is made. The ſecond is the number that is to be ſubſtracted, and the 3d. is the number which remaineth after the ſubſtraction is ended: As when I would ſubſtract 25 from 40. The ſaid 40 is the number from the which the ſubſtraction is made, and 25 is the number to be ſubſtracted, and 15 is the number which remaineth after you have ended the ſubſtraction: here followeth the practiſe. You ſhal

put

put the leſſer number under the greater in ſuch ſort that every figure of the one number, may anſwer unto every figure of the other orderly according to their places, and then draw a right line under thoſe two numbers as you did in Addition. Then muſt you begin at the right hand, and take the firſt figure of the undermoſt number, & ſubſtract that from the firſt figure of the uppermoſt number over it, and that which remaineth you muſt ſet underneath the line right under the figure which you have ſubſtracted: then afterward take likewiſe the ſecond figure of the nethermoſt number, & abate that alſo from the ſecond figure of the higher number: the third from the third, and ſo forth of all the reſt till you come to the end, putting alwayes the remain of every figure under the line in his due order and place, as by example. I will ſubſtract 2345, from 9876, after that I have ſet them downe according to the manner aforeſaid. Then beginning at the firſt place next to my right hand, I take firſt 5 from 6, & there reſteth 1: the which 1 I ſet under the line right againſt 5. Secondly I ſubſtract 4, from 7, & there reſteth 3: the ſaid 3 I ſet in the ſecond

$$\begin{array}{r} 9876 \\ \underline{2345} \\ 7531 \end{array}$$

cond place under the line next after 1. Thirdly I substract 3, from 8, and there resteth 5, the which 5 I put under the line in the third place next after 3. Finally I doe substract 2, from 9, and there resteth 7: the which 7 I put under the line in the fourth and last place next after 5, and thus is this substraction ended, in the which there remaineth 7531.

But when two figures of one likenesse doe chance to meet, so that the one must be substracted from the other, as if I should substract 7 from 7, there would remain nothing: then must I set a Cipher 0, under the line. But when the figure which is to be substracted doth exceed that figure which is over him, so that it cannot be taken out of the same figure; Then must you substract the undermost figure from 10, and that which doth remain, you shall adde unto the same figure which is uppermost. And the summe which resulteth of them both you shall set under the line. But whensoever you doe borrow any such 10 of the over number: you must adde 1 unto the next nethermost figure following which is yet to be substracted. And there is nothing else to be done in substraction. Example, I will substract 93576, from 4037479,

4037479, after that I have placed my two numbers as I ought to doe, I doe first substract 6, from 9 and there resteth 3, then I put the 3 under the line right under the 6.

4037479.
93576.
3943903.

And secondly I substract 7 from 7, and there resteth nothing: I do therefore put a Cypher o under the line right against 7 in the second place. Then I come to the third place where I find 5, which I cannot substract from the figure over him, which is but 4, therefore I do substract it from 10: as before I taught, and there resteth 5, the which I doe adde with the 4 which is over him, and that maketh 9: I put 9 in the third place under the line for the third figure. Fourthly, for the 10 which I borrowed I adde 1 unto the next figure which is to bee substracted, which is 3, and they make 4: the said 4 I doe substract from the over figure 7, and there resteth 3, I put 3, under the line for the fourth figure. And then I come to the fift place where I doe find 9, which I cannot substract from the figure over him, which is but 3, but I doe substract 9 from 10, and there resteth 1, the which figure 1 I doe adde with 3, and they make 4: I put

put 4 under the line for the fift figure. And here is to be noted that if it were not for that I did at the last borrow 10, the substraction should have been ended. But because that I must (for every such ten that I borrow) alwayes adde unto the next lower figure following, I must therefore proceed unto the substraction. And for because that there is no other figure following in the lower number, it shall suffice to have kept the unite and to substract it from the next over figure. But I find there 0, and therefore I cannot substract 1 from 0, therefore I substract it from 10, and there resteth 9 which I doe put under the line in the first place: finally, for the ten which I borrowed, I keep 1 in mind: The which I doe abate from 4, and there remaineth 3, the which 3 I doe put under the line in the seventh place after 9, and the operation is thus ended.

Another Example.

576084026
485675437
90408589

But if there were many numbers to be substracted from one number alone, then must

must you first adde those numbers together according unto the instruction of the chapter going before, and afterward to make your substraction as above is said. As if I would substract these three summes 123, 234,456, from 98925: first I doe adde the three summes into one, and they are 813. The which I doe substract from 98925, and there resteth 98112.

But if the summes be composed of divers kinds of denominations, then you must begin at the least denomination next toward your right hand, and so substract every denomination from his like if it may be substracted, if it cannot be substracted, then you must borrow 1 of the next denomination toward your left hand, and reduce the same into the like denomination of that figure which is to be substracted, then shal you substract your first or least denomination from the said sum so borrowed and that figure or number that shall remaine, you must adde with the uppermost number of the least denomination, and set the aggregate under the line right against his like. Then the 1 which you did borrow must be added with the next figure of the next denomination that is to be substracted, and so to proceed with the whole summe

ſumme that is to bee ſubſtracted.

Example.

I would ſubſtract 15 li. 17 s. 11 d. from 28 li. 13 s. 9 d. I doe firſt put down the great ſumme, and under that the leſſer with a line under them, as here you ſee, and then I doe beginne at the leaſt denomination which are pence, where I ſay 11 pence from 9 pence, I cannot.

li.	s.	d.
28.	13.	9.
15.	17.	11.
12.	15.	10.

28 = 13 = 9

And therefore I doe borrow 1 s. of the next denomination that is of the 13 s. the which 1 s. is 12 pence: Then I ſubſtract 11 pence from 12 pence, and there remaineth 1 peny, the which 1 peny I doe adde with 9 pence, and they make 10 pence: the ſaid 10 I ſet under the line, and doe keep the 1 s. in my mind that I borrowed, then I come to the ſecond denomination of ſhillings, where I doe find 17 s. then I ſay 1 s. that I borrowed and 17 do make 18 s: the ſaid 18 s. out of 13 s. cannot be: therefore I doe borrow 1 li. of the next denomination, that is to ſay out of the 28 li. and the ſaid 1 li. are 20 s. then I ſubſtract 18 s. from 20 s. and there remaineth 2 s. with the which I doe adde the 13 s. and they doe make 15 s: the ſame 15 s. I ſet under the line,

line, and I doe keep 1 li. to be added to the lower place of pounds: then I say 1 li that I keep, and 5 are 6: I substract 6 li. from 8 li. and there remaines 2, I set the said 2 under the line against 5: and last of all, I come to the tens of pounds where I doe find 1, then I substract that 1 from 2, and there remaineth 1: which I set under the line, and so I find there remaineth 12 li. 15 s. 10 d. and so is to be done of all other like.

Of Multiplication.

Chap. 4.

In Multiplication there are three numbers to be noted, that is to say, the number which is to be multiplyed, that which we call the Multiplicand: the second is the number by the which we doe multiply, which we will name the multiplyer, or Multiplicatour. And the third number is that which commeth of the multiplication of the one by the other, which is called the Product. As when I would know how much amounteth 10, multiplied by 9, that is to say, how much are ten times nine, I find

find that they are worth 90, then 10 is the Multiplicand, and 9 is the Multiplyer, and 90 is called the Product. So that to multiply, is none other thing, but to find a number which containeth the multiplicand so many times, as the multiplyer containeth unites: As 10, multiplyed by 9, do make 90 as before is said. And 90 containeth 10 so many times, as 9 containeth unites, that is to say, nine times.

In Multiplication it forceth not much which of the two numbers be the multiplicand, nor which be the multiplyer. For 10 multiplyed by 9, maketh as many as 9 multiplyed by 10. yet neverthelesse it shall be more commodious that the lesser number be alwayes the multiplyer.

And for that, that the multiplication of figures the one by the other, is the chief & necessariest kind whereby to know how to work in the multiplication of compound numbers, and that every man hath not the same at the fingers end, I will therefore give you here certain easy wayes of multiplication of digit numbers. When you would multiply two simple figures, or digits the one by the other, substract each of those digit numbers from 10. Then multiply the two remaines the one by the other, and if the

sum

sum doe exceed 10, write only the first figure and keep the other to be added to the next operation, which is thus as followeth. Adde your two simple figures together: and of that which resulteth of the addition, take only the first figure, unto the which you must adde the unit which you did keep before. And that shall be the second figure of the sum which you doe seek. Example. I would multiply 7 by 6, I take 7 from 10, and there resteth 3: likewise I substract 6 from 10, and there resteth 4, then I say thus, 3 times 4 make 12: I write 2 for my first figure, and keep 1 in mind: then I adde 6 with 7, and they are 13: of the which I cast away the second figure toward my left hand which is 1: and I take onely the first figure 3 which is toward my right hand, unto the which I add the unit which I kept, and they make 4, which I write in the second place after 2, and thus I find 42 which is the value of 7 multiplyed by 6.

Otherwise, and all cometh to one effect: set down your two digit numbers the one right over the other, and right against every of them toward the right hand write his own difference from 10: Then multiply the two differences together, the figure

which cometh thereof, you shall set downe under both the differences if it be a digit number, that is to say, any number under 10. But if there be two figures, set down but the first, and keep the other in your mind, afterwards substract (from one of the two digit numbers) that were first set down, the difference of the other digit number, that is to say, crosse-wise. And unto the remaine adde the figure which you kept before: and that shall be the second number, and thus you shall have your multiplication. Example of the same figures, that is to say of 7, multiplied by 6, the difference of 7 from 10, is 3: And the the difference of 6, from 10, is 4: I set them downe crosse-wayes as you see: And then I say three times 4 are 12: I set down 2 and keep 1 in my mind, then I substract 4, from 7 or else three from 6, it forceth not from which of them, and there resteth alwayes 3: unto the which I adde the unite which I kept in my mind, and they are 4, which shall be the second figure of the multiplication. And thus I find that 7, multiplyed by 6, maketh 42: as in the other operation. This practise hath no place where the two digit

digit numbers (doe not exceed 10,) by adding them together, and then is multiplication easie enough without any rule.

Another way to know the multiplication of simple numbers, is by this table following: the use whereof is thus.

First you shall understand that the numbers from 1, and so descending downwards to 9, which are set in the left part or hanging margine of this table, doe betoken the multiplyers of all simple numbers. And the elemēts or figures being put highest, in every square room drawing toward your right hand right against every of the multipliers, do signifie the multiplicands, which do appertain unto the multiplyers of the hanging margine. And the lower or inferiour numbers in every square roome, doe betoken the product of that multiplication, which is made in multiplying the upper number over it, with the figure in the hanging margine answering directly unto the said square: as by example.

The Table of Multiplication by all the Digit Numbers.

1	1 1	2 2	3 3	4 4	5 5	6 6	7 7	8 8	9 9
2	2 4	3 6	4 8	5 10	6 12	7 14	8 16	9 18	
3	3 9	4 12	5 15	6 18	7 21	8 24	9 27		
4	4 16	5 20	6 24	7 28	8 32	9 36			
5	5 25	6 30	7 35	8 40	9 45				
6	6 36	7 42	8 48	9 54					
7	7 49	8 56	9 63						
8	8 64	9 72							
9	9 81								
10	10 100								

Multiplication.

First because 1 doth not multiply, I have set in the upper margine the figures from 1 to 9, both in the higher and also in the inferiour rowes, for 1 in the hanging margine, multiplyed by 1, the upper number in the first square bringeth but 1. So likewise 2, being the higher number in the second square, of the upper margin, multiplyed by 1 in the hanging margin, bringeth 2 for the lower number in the second square of the upper margin: for 1 times 1, maketh but 1: And 1 times 2 maketh 2. Then 1 times 3 maketh 3: And 1 times 4 maketh 4: And so continuing toward the right hand untill I come to the figure of 9, which is 1 times 9 maketh 9. Then afterwards I multiply 2 of the hanging margin by 2, which is the upper number of the square next toward the right hand, and that maketh 4 which is the product of 2 multiplyed by 2, that 4 I set under the 2, for 2 times 2 are 4 and 2 times 3 maketh 6: then 2 times 4 maketh 8, and 2 times 5 maketh 10, and so continuing unto 2 times 9, which maketh 18. The like is to be done with the third row, and so likewise of all the residue.

Example, I would know what is the product of 9, multiplyed by 8, I seek in the

hanging margin the multiplyer 8, and amongst the squares directly against 8, drawing toward the right hand, I seek the multiplicand 9, in the higher row, and I find the product right under 9, to be 72: Then 72 is the number which commeth of the multiplication of 9, by 8. And so is to bee understanded of all the rest of the table. Which table must be (of all men) learned by heart, or as they say without book: which being learned, you shall the better attain to the rest of Multiplication.

To come now unto the practise of multiplication, when you would multiply two numbers, the one by the other, you must set them down after the same manner as you did in addition, and in substraction. That is to say, the first figure of the multiplyer under the first figure of the multiplicand, the second under the second, and the third under the third, if there be so many, and then draw a right line under them, as in the other operations going before. After this you shall multiply all the figures of the multiplicand by the multiplyer, and set down the figures (comming of any such multiplication) under the line every one in their due order and place.

Example, I would multiply 123 by 3, that

that is to say, I would know how much amounteth three times one hundred, twenty and three. The two numbers being placed in such order as is before said, you must begin towards the right hand: and say thus 3 times 3 are 9: write downe down 9 under the line, right against 3, for the first figure: secondly by the same 3, you must multiply the second figure 2, and they make 6, put down 6 after the 9 under the line: Thirdly by the same 3 you shall multiply the last figure 1, and they are but 3, set down 3 after 6 for the third and last figure. And thus is the work ended: whereby you shall find, that 123 being multiplyed by 3 maketh 369.

$$\begin{array}{r} 123 \\ 3 \\ \hline 369 \end{array}$$

But when it happeneth that of the multiplication of one figure by another, the sum which commeth thereof shall be of two figures, as it happeneth often, then shall you write down the first figure, and keep the other figure to be added unto the multiplication of the next figure.

Example, 6 men have gained (every one of them) 345 crownes, I would know how many crownes they had in all.

First I multiply 6 by 5, they make 30. I write 0 under the line, and for 30 I doe keep 3 to be added to the next multiplication: Secondly, I say 6 times 4 are 24: unto the which I adde 3, which before I reserved: And they make 27. I write 7 in the second place under the line, and I keep 2, to be added to the next multiplication: Thirdly, I say 6 times 3 are 18, unto the which I adde the 2 which I keep, and they make 20, the which I write all down for because that is the last work. And so I find that 345 being multiplyed by 6, doe make 2070. But when the multiplyer is of many figures, you must multiply all the whole multiplicand by every one of those figures, and write the products every one orderly under his own figure.

$$\begin{array}{r} 345 \\ 6 \\ \hline 2070 \end{array}$$

Example. I would know how many dayes are past from the Nativity of Jesus Christ untill the year 1560 full compleat. I must now multiply 1560, by 365 dayes: because there are so many dayes in one whole yeare. The leap yeares not being reckoned, which have every one of them 366 dayes.

There-

Therefore first by the figure 5: I multiply all the higher figures saying thus, 5 times 0, maketh 0: I write 0, under	1560 $36\cancel{5}$ ——— 7800

the line for the first figure, and because I keep nothing for the next place, I proceed and say: 5 times 6 are 30: I set 0 under the line for the second figure, and I keep 3 to bee added to the next multiplication: Thirdly I say, 5 times 5 are 25: The which with the 3 that I keep are 28: I set down 8 for the third figure, and keep 2 to be added with the next multiplication: Then comming unto the fourth and last figure, I say 5 times 1 are 5: the which with the 2 that I reserved are 7: I put 7 for the last figure of this first work by the figure 5: with the which figure I have no more to doe, And therefore I cancell the same $\cancel{5}$ with a little stroke through it, to signify that I have finished with that figure. And for as much as in multiplication there is alwayes as many simple operations, as the multiplyer containeth figures, there resteth yet 2 works to be made. I come therefore unto the second work which is the figure 6. by the which I must again multiply all the figures of the multiplicand as I did by 5, and the first figure (which shall

be

1560
365
———
7800

be produced) I doe put one rank more lower then the figures of the work now last made by 5 : not right under the first figure of the multiplyer 5, but under 6 : that is to say, one degree or place neerer toward the left hand : and one rank more lower then the first work : and I must put afterward every of the other figures which commeth of the same multiplication in their order: thirdly, I doe make the multiplication by the third figure, and that which shall come thereof I must set in his ranke, as hereafter shall appeare. And now I need make no further discourse hereof, because that he which can doe the first multiplication by 5, may as easily doe all the other. It shall therefore suffice to set here under the examples of all the 3 sundry works.

1560 5 7800	1560 65 7800 9360 101400	1560 365 7800 9360 4680 569400

Now, if you will know how much all the three workings thus placed, doe amount unto, which in value must be but one number : you must adde all the numbers which are

are come of all the 3 multiplications together, but not after the same manner, as we have done in the Chapter of addition, the first figure of the first rank, with the first figure of the second rank, and so of the third: but you must adde them in the same sort as you shall find them situated and placed: that is to say, the first figure of the first rank alone by it selfe: the second of the first rank with the first of the second rank. The third of the first rank with the second figure of the second rank, and with the first of the third rank: and so of all the other as hereafter doth appeare.

And thus the 1560 years doe containe five hundred sixty and nine thousand foure hundred dayes, not counting herein the dates of the leap-yeares, which are here in number 390, for then the whole sum of the dayes should be 569790.

```
  1560
   365
------
  7800
 9360
4680
------
569400
```

Another

Another example.

34560
2456
207360
172800
138240
69120
84879360

The sum of multiplication is thus, when you would multiply any number by 10, you shall onely put one cipher o before all the numbers, that is to say, a degree neerer the right hand, as 345 multiplyed by 10, maketh 3450. If you will multiply any number by 100. adde unto the same number two ciphers thus 00. if by 1000 adde 000. And to be briefe when the last figure of the multiplyer is 1 and all the rest be Ciphers, adde so many Ciphers to your multiplicand, as there shall bee found Ciphers in your multiplyer, but if in your multiplying, the last figure were not 1, but that there were only certain ciphers in the beginning: and that the other were signifying figures, and likewise those of the multiplicand, then shall you put those Ciphers apart and multiply the signifying figures of the one, by the signifying figures of the other. Then adde unto the product of that multiplication,

on, all the Ciphers which you did before put apart. As if I would multiply 46000, by 3500. I put apart the three ciphers of the first, and the two ciphers of the second numbers which are in all 5 Ciphers 00000: And then I multiply 46 by 35, and thereof commeth 1610: Before the which toward the right hand, I adde the 00000 that I did put apart, and then the whole product will be 161000000.

$$\begin{array}{r} 46 \\ 35 \\ \hline 230 \\ 138 \\ \hline 161000000 \end{array}$$

Of Division.

Chap. 5.

Division or partition is to seek how many times one number doth contain another, or else how often times one number may be found in another; for in the work of Division there are required two numbers to be first known, for the finding out of the third. The first number known, is called

led the Dividend or number which is to be divided, & that must be the greater number. The second number is called the Divisor, and that is the lesser. And the third number which I doe seek, is called the quotient. As if I would divide 36 by 9, the dividend shall be 36: and the divisor is 9. And for because that 9 is contained in 36 four times, that is to say, 4 times 9, doe make 36: The quotient shall be 4, as if you mark well, how many times 9 is contained in 36, you shall find it 4 times: and therefore 4 shall be the quotient.

The practise.

Write down first the dividend in the higher number, and the divisor underneath, in such sort, that the first figure of the divisor toward the left hand, be under the first figure of the dividend, and every figure of the same divisor under his like, that is to say, the first under the 1. the second under the 2. the third under the 3. & so consequently of the other, if there be so many, which is contrary to the other three kinds before specified: but yet you must consider further, if all the lower figures of the divisor, may be taken out of the higher figures of the dividend, by the order of subtraction or not. The which if you cannot doe, then must you

you ſet the firſt figure of the diviſor (toward the left hand) under the ſecond figure of the dividend, and ſo conſequently the reſt in their due order, if any be to be ſet down, every one of them under his like, as before is ſaid. And then draw a line between the dividend and the diviſor. And at the end of them another crooked line, behind the which toward the right hand, ſhall bee ſet your quotient. As by this example following, where the diviſor is but of one figure.

If you would divide 860, by 4, you muſt ſet down 4 under the 8 with a line between them, as here under you may ſee.

The dividend.	860
Diviſor.	4

And then you muſt ſeek how many times the diviſor 4 is contained in the higher number that is to ſay in 860, the dividend anſwering to him, as in this our example I muſt ſeek how many times 4 is contained in 8, in the which I find it 2 times, then I write down 2 apart behind the crooked line, as here you may ſee, which ſhal be the firſt figure of the quotient to come: ſecondly by this figure 2 (being thus put apart) I muſt multiply the diviſor 4: and under the ſame multiplication, I muſt ſet

860
4(2
8

that

that number which commeth of the ſame multiplication as 2 times 4 doe make 8, the which 8 I doe ſet under the diviſor 4. Thirdly, I doe ſubſtract the product of the ſaid multiplication (of the quotient by the diviſor) that is to ſay, 8 from the higher number correſpondent to the ſame, in ſaying 8 from 8 there remaineth nothing, and then I cancell or ſtrike out that which is done as you ſee. In theſe three operations and works is comprehended the art of Diviſion. The which are to be obſerved from point to point, for there is no diverſity in the finiſhing of the ſame, which is thus.

Now ſecondly I muſt remove my diviſor one place neerer toward my right hand, as in proceeding with our example. Here you ſee I remove my diviſor 4, which was under 8, and I ſet it under 6, then I ſeek how many times 4 is contained in 6: where I find it but one time, then I ſet one behind the crooked line next unto the firſt figure of the quotient 2, a degree or place neerer my right hand, afterward by this laſt and new figure 1, I multiply the diviſor 4, and that maketh but 4 (for an unit which is but 1 encreaſeth nothing) I abate therefore 4 from the higher figure 6, and

```
 2
~~8~~ ~~6~~ 0 (21
 4
```

6, and there resteth 2, the which 2 I set over the 6: and I cancell the 6, for so must I doe when there resteth any thing after I have made the substraction. Thirdly for as much as there yet remaineth another figure in the dividend, I remove again the divisor, and I set it under the cipher. Then I seek how many times 4 is in the higher number which is 20, where I may find it 5 times, I put therefore 5 behind the crooked line for the third and last figure of the quotient. Then by the same 5, I multiply the divisor 4 and that maketh 20, the which 20 I abate from the higher number, and there resteth nothing. And so is this division ended: and thus I have found the 860 being divided by foure bringeth for the quotient 215: that is to say, that foure is contained in 860, two hundred and fifteen times. This is the most easiest working that is in division, but that which followeth, appertaineth to the whole and perfect understanding of the same. When the first figure of your divisor toward your left hand, is greater then the first of the dividend, you must not place the first figure of your divisor right underneath the first of

```
  2
 8̶6̶0(215
   4
  2̶0̶
```

 the

the dividend, but under the second figure of the same dividend, neerer to your right hand, as before is said. Therefore when the divisor is of many figures and that you have to seek how many times it is contained in the higher number (for the more easier working) you must not seek to abate the divisor all at one time, but you must see and mark how many times the figure of the same toward the left hand is contained in the higher number answering to the said number, and then to work after the same manner as is before taught.

Example, I have 316215 crownes to be divided among 45 men, and for to make my division I must not put the first figure of the divisor which is 4, under the first of the dividend, which is 3, because that 4 is a greater number then 3. And further, you know that I cannot take 4 out of 3, Wherefore I must set the 4 under the second figure of the higher number, that is to say, under 1, and the figure 5 of the divisor, right under the 6, as here you may see.

So that I must first seek, how many times 45, is contained in 216, which is but part of the dividend, Wherfore for the more easie working I need but to seek how many

316215
45

ny times 4 is contained in 31. And because I may have it seven times, I put 7 behind the crooked line, as is aforesaid: then by 7 I multiply all the divisor 45, and they are 315: the which I set under that same divisor, the first figure under the first: and the other in order toward the left hand. Then I subtract 315, from the higher number 316: and of this first working there remaineth but 1, the which I set over the 6, and I cancell likewise the 315, and the other figures 316, and also the divisor 45: and then it will stand thus, as in the margent.

$$
\begin{array}{l}
\quad\;\; 1 \\
\cancel{3}\cancel{1}\cancel{6}215 \\
\hline
\;\;\cancel{4}\cancel{5}\;\;(7 \\
\;\cancel{3}\cancel{1}\cancel{5}
\end{array}
$$

And when I come to remove the divisor, and that I must seek how many times it is contained in the higher number, if I see that I cannot find it there, that is to say, that if the higher number be lesser then the divisor, as it is in this example, then must I put a cipher in the quotient behind the crooked line, and if there remain any figures in the dividend which are not yet finished: I must remove the divisor again neerer toward my right hand by one place, for to find a new figure in the quotient. As in this our example, for after that I have

```
    1
  ~~31~~6215
   45 (70
```

removed the diviſor, I ſeek how many times 45, is contained in 12: and becauſe I cannot have 45 in 12, I put a 0 behind the crooked line after 7: then without multiplying or abating, I remove again the diviſor neerer toward my right hand, and I ſeek how many times 4, (which is the firſt figure of the diviſor) is in the higher number, that is to ſay, in 12, whereas I find it 3 times: I put 3 behind the crooked line, for the third figure of the quotient: then by the ſame figure 3, I multiply the diviſor 45, & thereof cometh 135.

```
    1 1
  ~~31~~6215
     45(703
    135
```

And in the number over it there is but 121, ſo that I cannot take it out of 121, which is the leſſer number. And therefore here is to be noted, that if it happen, that the figure being laſt found which is put in the quotient, doe produce or bring forth a greater number (in multiplying all the diviſor by the ſame) then that which is over the ſaid diviſor: you muſt then make the ſame figure of your quotient (which you do put down) leſſer by 1, and after that you have cancelled the firſt multiplication, you muſt make a new. And the ſame muſt bee done ſo often times:

times: as (in decreasing the same) it may product a lesser number, or at the least, a number equall to that which is over it, as in the last work, for because that the divisor being multiplyed by 3, bringeth forth 135, which amounteth more then 121. Therefore the same product must be cancelled, and the figure 3 which I did put in the quotient, must be also changed into a figure of 2. Then by the said 2, I must multiply the divisor 45, and thereof cometh 90; the which I abate from 121, and there remaineth 31. And then will the sum stand thus as followeth.

~~1~~3
~~3~~~~6~~~~2~~15

~~45~~   2
~~135~~   (70~~3~~
~~90~~

And here is also to be noted that the sum which remaineth must bee alwayes lesser then the divisor. Then finally I remove the divisor to the 2 next figures toward the right hand, and I seek how many times 4 is in 31, and for because I find it 7 times, I put 7 in the quotient, by the which I multiply the divisor, and thereof cometh 315, the which I abate from the higher

number of the dividend, and there remaineth nothing as here you may see.

23
316215
45 (7027
315

But if it happen that after the division is ended, there doe remain any thing in the dividend, as oftentimes there doth: I must also set them that remain apart behind the crooked line, after the entire quotient, and the divisor right under the same remaine, with a line between them both. As in this division following, where there remaineth 3 in the last work. And what the same doth signifie shall be taught unto you when I shall treat of fractions or broken numbers.

i.	ii.
11	11
467859	467859 (10
456 (1	456

iii.	iiii.
2	2
2173	21783
467859	467859 $\frac{3}{456}$
456	456 (1026
912 (102	2736

In

In summe, all the whole practise of division may be kept in remembrance by three letters, that is to say: S. M. and A. which three letters doe signify to seek, to multiply, and abate.

First I must seek how many times the divisor is contained in the higher number: then by the quotient (which I find) I must multiply the divisor: finally, I must abate the product of the multiplication, from the higher number correspondent to the same, that is to say: out of the dividend, answering to the divisor.

And further, besides this kind of working in division, the which is regular and commune: I will here put another manner of working very easie. The which shall serve for such divisions as are more difficill to be wrought. That is to wit, when the number to bee divided is very great, and the divisor great also, and it shall serve again for to avoide errour in supputation, and for the placing of fewer figures in the quotient: and consequently it shall save much labour unto them which as yet have not much studied in this art. The practise whereof is thus as followeth.

If you would divide 7894658, by 643.

First you shall understand, that although

the figure of the divisor toward your left hand, may bee found many times in the higher number, as 10 times, 12 times, or more: yet is it so, that you must never put but one figure onely at a time in your quotient. And you shall at no time put any number in your quotient which exceedeth the figure of 9, that is to say, any number being greater then 9. And therefore for to come unto your practise, write down your divisor one time, and behind it toward your right hand, draw a line down straight, and right against the same divisor behind the line toward the right hand, put this figure 1. Then double your said divisor and right against the same which you have doubled, put behind the line the figure of 2. This done you shall adde unto the same number that you doubled, your said divisor, and right against the same product, behind the line you shall put the figure of 3, and unto this third product you must adde again your divisor, and right against the same product behind the line, set the figure 4. And this must you doe, untill you come to the figure of 9, in such sort that every of the products doe surmount so much his former number, as all the divisor doth amount unto: placing at the right side of every product behind

hind the line, the number which ſignifyeth how much he is in order. That is to ſay, right againſt the fift product, you muſt put 5, and right againſt the ſixt product, you muſt put 6 : And ſo likewiſe of all the other.

The Example.

Example of the diviſor propoſed, 643 : Firſt of all I write downe 643, and right againſt the ſame behind the line toward my right hand, I put 1 : ſecondly, I double 643 : and they make 1286 : and right againſt the ſumme behind the line, I put 2 : Thirdly, unto that ſame 1286, I adde the diviſor 643, and they are 1929, and right againſt the ſame I ſet 3. Fourthly, unto the ſaid 1929, I adde the diviſor 643, and they make 2572 : and right againſt the ſame I put 4. And thus muſt you doe allwayes by encreaſing ſo much every product, as the diviſor doth amount unto, untill you have ſo done nine times, as you ſee in this preſent Table.

643	1
1286	2
1929	3
2572	4
3215	5
3858	6
4501	7
5144	8
5787	9

643 | 1
1286 | 2
1929 | 3
2552 | 4

This being done, you muſt ſet downe your

your Divisor under the dividend 7894658 after the same manner as is before declared: that is to say, 643, under the three first figures of the dividend toward your right hand, namely under 789. Then must you seek how many times 643, are contained in 789: And for to know the same, you must look in the aforesaid table, if you may there find the same number 789, the which is not there. Therefore you must take a lesser number, the neerest to it in quantity that you can find in the table, the which is 643, which number hath against it on the right hand of the line, this digit 1: Then take the said 1, and put it behind the crooked line, for the first figure of the quotient.

Then must you abate 643 from 789, and there will remain 146, the same shall you put over the 789, and cancell the 789: and thus is the first work ended. Then set forward the divisor one figure neerer to your right hand, and seek a new quotient as you sought this, where you find the higher number over your divisor to be 1464. The which seek in the table, and for because you cannot find it there, you must take a lesser number, the nighest to it that you can find, and that is 1286: which number hath against it this Digit 2. Therefore you must put

put 2 for the ſecond figure of the quotient behind the line, and then abate 1286 from the ſaid 1464 and there will remaine 178. Thirdly, remove forward the diviſor as you did before, & you ſhall find the higher number over it to be 1786, ſo that the next leſſer number to it in your table, is again 1286, put therefore once again 2, in the quotient for the third figure: and abate the ſaid 1286 from 1786, ſo there will remain 500.

Fourthly, ſet forward the diviſor: and the higher number over it, is 5005, and the next leſſer number to it in your table, is 4501 right againſt the which is 7, put 7 in the quotient, for the fourth figure. And after that you have abated 4501, from 5005: there will remain 504. Finally, remove forward your diviſor unto the laſt place: and you ſhall find the higher number over it to be 5048. And the next leſſer number to it in your table, is 4501. Therefore ſet 7 again in the quotient, for the fift and laſt figure. Then ſubſtract 4501 from 5048, and there will remaine 547: which muſt be put at the end of the whole quotient with the diviſor under it, and a line between them in this manner following.

(12277. $\frac{547}{643}$

The

The summe of Division.

WHen you would divide any number by 10: you must take away the last figure next towards your right hand, and the rest shall be the quotient. Example: As if you would divide 45845, by 10: take away the 5, and then 4684, shall be the quotient, and the 5, shall be the number that doth remaine. Likewise when you would divide any number by 100, take away the two last figures towards your right hand, and if you would divide by 1000, take away three figures, if by 10000, take away foure figures. And so of all other, when the first figure of the Divisor to ward the left hand shall be onely 1, and the rest of the same Divisor being but Ciphers.

5
45 84(
1

Here follow the proofes of *Addition*, *Substraction*, *Multiplication*, and *Division*.

The proofe of *Addition*.

WHen you would prove whether your Addition be well made, consider the figures of the numbers which be added,

added, every one in his simple value, not having any regard to the place where he standeth, but to reckon him as though he were alone by himselfe, and then reckon them all, one after another, casting away from them the number of 9, as oft as you may.

And after your discourse made, keep in mind the same figure which remayneth after the nines be taken away: or else set the same in a voyd place at the upper end of a line. For if your addition be well made, the like figure will remain, after that you have taken away all the nines out of the totall summe of the same addition, as oftentimes, as you may there find any: as in this addition which here you see, there remaineth 2 for each part.

24567	2
5329	
481	
30377	2

The proof of Substraction.

ADde the number which you doe substract unto that number which remaineth after the substraction is made, and if the totall summe of that addition, be like unto the number from the which the substraction was made, you have done well, otherwise

otherwise not: as in this example doth appear, where you see the number which is to bee substracted from 5463, is 3584, and the number which doth remain, is 1879, the which two summes being added together, doe make 5463, which is like to the higher number, out of the which the substraction was made, as before is said.

5463
3584
1879
5463

The proof of Multiplication.

The proof of Multiplication is made by the help of Division. For if you divide the number produced of the Multiplication, by the multiplyer, you shall finde the higher number which is the multiplicand.

The proofe of division.

To know if your division be well made, you must multiply all the quotient by your divisor, and if any thing doe remaine after your division is made, the same shall you adde unto the product which cometh of the multiplication, and you shall find the like number unto your dividend, if you have well divided: otherwise not.

Of Progreſſion.

Chapter. 6.

Progreſſion Arithmeticall, is a briefe and ſpeedy aſſembling or adding together of divers figures or numbers every one ſurmounting the other continually by equall difference: as 1, 2, 3, 4, 5, &c. here the difference, from the firſt, to the ſecond, is but of 1, and ſo doe all the other, every one exceed his former figure by 1, ſtill to the end. Likewiſe 2, 4, 6, 8, &c. doe proceed by the difference of 2. Alſo 3, 6, 9, 12, &c. doe every one differ from other by 3. And ſo may theſe numbers continue, infinitely after this order, in adding unto the third number, the quantity wherein the ſecond doth differ from the firſt: Likewiſe adding the ſame difference unto the fourth number, alſo to the fift, and ſo unto all the other: as 1, 4, the difference of the ſecond to the firſt is 3, adde 3 unto 4 and they are 7 for the third number. Then adde 3 unto 7, and they make 10 for the fourth number, and ſo of all other. Progreſſion Arithmeticall.

Then if you will adde quickly the number of any progreſſion, you ſhall doe thus, firſt tell how many numbers there are, and write their ſum downe by it ſelfe, as in this example,

example, 2, 5, 8, 11, and 14, where the number of their places are 5, as you may see, therefore you must set down 5 in a place
5. alone as I have done here in the margent. Then shall you adde the first number and the last together, which in this example are 14 and 2, and they make 16, take halfe thereof which is 8, and multiply it by the 5 which I noted in the margent, for the number of the places. And the sum which amounteth of that multiplication, is the just sum of all those figures added together. As in this example: 8 multiplied by 5 doe make 40. And that is the totall sum of all the figures. Another example of parcels that are even, as thus, 1, 2, 3, 4, 5, and 6. So that in this example, you must likewise note down the number of the places, as before is taught, and then adde together the last number and the first. And the summe which commeth of that addition, shall you multiply by halfe the number of the places which before are noted, and that, which resulteth of the same multiplication, is the whole sum of all those figures, as in this former example, where the number of the places, is 6, I note the 6 apart, and then I adde 6 and 1 together: which are the last and first numbers, and they make 7, the which

which I multiply by 3, which is halfe the number of places, and they make 21, and to ſo much amounteth all thoſe figures added together.

Queſtions done by Progreſſion *Arithmeticall.*

1 A Merchant hath ſold 100 kerſies, after this manner following, that is to ſay, the firſt peece for 1 s. the 2d. peece for 2 s. the third for 3s. and ſo forth, riſing 1 s. in every peece of kerſie unto the hundreth peece. The queſtion is to know, how much hee ſhall receive for the ſaid 100 peeces of kerſies? Anſwer. It behoveth you to know the addition of the 100 termes in this progreſſion: and therefore you muſt adde 1 s. which is the price of the firſt peece with 100 s. which is the price of the laſt peece, and thereof cometh 101: the ſame 101 you muſt multiply by halfe the number of places, that is to ſay, by 50, and thereof cometh 5050 s. which being divided by 20 s. thereof will come, 252 li. 10 s. 0 d. which is 2 li. 10. 6 d. apeece, one with another. Thus the 100 kerſies are ſold by the ſaid Merchant for 252 li. 10 s. 0 d. The practiſe followeth.

100		
1	1 1	
101	5050	(252li. 10 s.
50	2220	
5050		

Questions of *Progression*.

2. I would lay 100 stones or other things in a right line, & every of the said stones to be a just pace one from another, and one pace off from the 1. stone, there standeth a basket. I demand how many paces a man shall goe in gathering up the said stones, and bearing them unto the basket, the one stone after the other: Answer. First when he fetcheth the first stone & putteth it into the basket, he maketh 2 paces, for the second 4 paces, for the third 6, for the fourth 8: And so forth unto the last stone: wherefore the last term shall be 200: unto the which you must adde the first term which is 2, and they make 202, whereof the halfe is 101, the which you shall multiply by 100 which is the number of the terms in your progression: or else multiply 202 by 50, which is halfe the number of places, and thereof will come 10100 paces, and so many paces shall he goe in all.

Questions

Queſtions of Progreſſion *Arithmeticall.*

3. THere is a meſſenger which goeth every day 8 miles : ancther man followeth him incontinently, and he goeth the firſt day 1 mile, the ſecond day 2 miles . the third day 3 miles, and ſo increaſing his journey every day one mile by naturall progreſſion. The queſtion is to know, in how many dayes the ſecond man ſhall have overtaken the firſt. Anſwer : You muſt conſider that 8 is in the middle or halfe as well of the termes,as of the number of the dayes: And therefore double 8,thereof cometh 16 : Subſtract 1, and there will remain 15 : and in ſo many dayes ſhall hee have overtaken the firſt meſſenger. The proofe thereof is very eaſie. If the ſecond had gone the firſt day 2 miles , the ſecond day 4 miles, the third day 6 miles , and ſo increaſing every day his journey, by 2,in how many dayes ſhould he have overtaken the firſt man, for to do this, you muſt perceive that 8 is the middle and fourth terme. Therefore double 4, and they make 8,from the which ſubſtract 1 , and there remaineth 7, and in ſo many dayes he ſhould have overtaken him.

Questions of Progression *Arithmeticall.*

4. There is one man departeth from London to Chester, and so to Carnarvan, the distance being about 200 miles: Hee goeth the first day 1 mile, the second day 2 miles, the third day 3: and so orderly by naturall progression. Another man departeth at the same instant from Carnarvan to London, and goeth the first day 2 miles: the second day 4 miles, the third day 6 miles: and so encreasing every day 2 miles. The question is to know in how many dayes they two persons shall meet together. Answer: First you must consider that he which goeth by Progression naturall, maketh but halfe the way that the other doth, so that he shall have made but the one third part of the way, at their meeting together. Take therefore the $\frac{1}{3}$ part of 200, and you shall have *66* $\frac{2}{3}$. Then must you seek 2 numbers, whereof the greater of them, may be double unto the other, lesse 1: and that the one of them being multiplyed by the other, the product of them may bee *66* $\frac{2}{3}$, or little more, so that the more do not exceed the value of the greater term: as here in this question the 2 neerest numbers

bers are 12, add $6\frac{1}{2}$, which multiplyed the one by the other doe make 78, which is $11\frac{1}{3}$ more then is $66\frac{2}{3}$: wherefore that day when they should meet together, the first had gone but $\frac{2}{3}$ of a mile of his journy, which was upon the 12 day: then if you will know what part of a day they did meet, you must divide $\frac{2}{3}$ by 12, and you shall find $\frac{1}{18}$, of a day. Therefore in 11 dayes and $\frac{1}{18}$ part of a day, that is upon the twelfth day, they shall meet together.

5. IF a man doe owe me 1000 crownes, to be payd in 20 dayes, or terms, by Arithmeticall progression: The question is, to know with what number he shall begin and continue his progression: Answer: to doe this, you must adde 1 unto 20, and they make 21, the which you shall multiply by 10, which is halfe the number of places, and thereof cometh 210, and therefore divide 1000, by 210, and thereof will come $4\frac{16}{21}$, the payment of the first day, and by this number, doth the said Progression encrease, in this sort following: $4\frac{16}{21}$, $9\frac{11}{21}$, $14\frac{6}{21}$, $19\frac{1}{21}$, &c. And so of all others.

A man oweth me 40 li. to be paid in 10 yeares, by progression Arithmeticall, that is to say, 40li, at the end of the first yeare,

and every year following 40 li. to the end of 10 years: he offereth to pay me the said 400 li. all at one payment. The question is to know, at what time he ought to pay me the same at one payment, that I be not interessed in that time? *Answer:* adde 1 unto the number of the termes which are 10, and they make 11, whereof you must take the halfe, that is to say, $5\frac{1}{2}$: Therefore hee must pay me at 5 yeare and $\frac{1}{2}$ the said 400 li. all at one time: for that which he payeth before, is equall to that which remaineth unpaid.

This Rule hath place onely when the payments are equall. But if it happen, that the last payment be lesser then the others, you must in this case, put the last payment over one of the others, for to make thereof a fraction: that which must be added unto the number of the termes, and the halfe of the said summe being taken, shall shew the time, that the said patment ought to be paid at once. As if the said party did owe me but 380 pounds, to be paid every yeare 40 li. it is certain that he must have 10 yeare to end the payments. And it is true that upon the 10 day there would remain but 20 li. to be payd: And therefore put 20 over 40 in this sort $\frac{20}{40}$, and that maketh

maketh $\frac{1}{2}$, the which you ſhall adde unto the number of terms, and you ſhall have 10$\frac{1}{2}$, whereof the halfe which is 5 $\frac{1}{4}$, doth ſhew that he muſt pay the ſaid 380 li. at 5 years $\frac{1}{4}$, all at one payment, and ſo of all ſuch like.

Progreſſion Geometricall is when the ſecond number containeth the firſt in any proportion: as 2, 3, or 4 times, and ſo forth. And in like proportion ſhall the third number contain the ſecond, and the fourth number contain the third, and the fift the fourth, &c. As 2, 4, 8, 16, 32, 64: here the proportion is double. Progreſſion Geometricall.

Likewiſe 3, 9, 27, 81, and 243: are in triple proportion.

And 2, 8, 32, 128, and 512, are in proportion quadruple.

That is to ſay, in the firſt example, where the proportion is double, every number containeth the other 2 times, as 4 containeth 2, two times: 8 containeth 4, two times, &c. In the ſecond example of triple proportion, the numbers exceed each other three times. And in the third example, the numbers exceed each other four times, and thus you ſee that Progreſſion Arithmetical, differeth from progreſſion Geometricall for that, that in progreſſion Arithmeticall the exceſſe is onely in quantity, but in pro-

gression Geometricall, the excesse is in proportion.

Now if you will easily find the sum of any such numbers, you shall doe thus, consider by what number they be multiplyed, whether they be multiplyed by 2, 3, 4, 5, or by any other: and by the same number, you must multiply the last sum in the progression. And from the product of the same multiplication, you shall abate the first number of the progression. And that which remaineth of the said multiplication, you shall divide by 1 lesse then was the number by the which you did multiply, and the quotient shall shew you the sum of all the numbers in any progression. As in this example, 5, 15, 45, 135 and 405: which are in triple proportion, now must you multiply 405, which is the last number by 3: because they are in triple proportion, and they are 1215, from the which you shall abate the first number of the progression, which is 5, and there remaineth 1210: the which you shall divide by a number lesse by 1, then that was by the which you did multiply, that is to say by 2: and you shall find in the quotient 605: which is the totall sum of the numbers of that progression. Likewise 4, 16, 64, 256, and 1024, which are in propor-
tion

tion quadruple: therefore you shall multiply 1024 by 4, and thereof will come 4096 from the which abate the first number 4, and there will remain 4092: The which you must divide by 3, and you shall find in your quotient 1364: which is the totall sum of that progression, and this shall be sufficient for progression.

A question of progression *Geometricall.*

A Merchant hath sold 15 yards of Satten, the first yard for 1 s. the second 2 s. the third 4 s. the fourth 8 s. and so encreasing by double progression Geometricall. The question is to know how much the said Merchant shall receive for the said 15 yards of Satten? *Answer*: First it is needfull to know how much the whole numbers of the said Progression do amount unto together. And for to do it you must find the last term, therefore you must set down the said progression unto the 8 term, which is 128: the which you shall multiply by it selfe, and thereof cometh the fifteenth term, that is to say, 16384: the same shall you multiply by 2, for because the progression is double. And thereof will come 32768, from the which you must substract the

the first term which is 1. And the rest being 32767. is the just sum of the 15 terms: and consequently the 15 yards of satten shall be worth 32767 shillings, the which are 1638 li. 7 s.

The VII. Chapter treateth of the Rule of Three, called the Golden Rule; or the Rule of four *Proportionals*.

The rule of Three is the chiefest, the most profitable, and the most excellent rule of all the rules of Arithmetick. For all other rules have need of it, and it passeth all other, for the which cause it is said that the Philosophers did name it the Golden rule, and after others opinion and judgement, it is called the rule of proportion of four numbers. But now in these latter dayes, by us it is called the Rule of three, because it requireth three numbers in his operation. Of the which three numbers, the two first are set in a certain proportion, and in such proportion as they be established, this rule serveth to find out unto the 3d. number, the fourth number to him proportioned, in such sort as the second is proportioned unto the first. Not for that, that

that the four numbers, nor yet the three, are or be proportionall, or set in one proportion, but such proportion, as is from the 1. to the 2. ought to be from the third unto the fourth, that is to say, if the second number do contain the first two times or more, so many times shall the fourth number contain the third. And note well that the first number and the third, in every rule of three ought and must be alwayes of like denomination, and of one condition and nature. And the second number, and the fourth must likewise be of one semblance and likenesse, and are dissemblant, and contrary to the other two numbers: that is to say, to the first, & the third. And if you do multiply the first number by the fourth, and the second number by the third, the products of your two multiplications will be equall. Likewise if you divide the one semblant by the other, that is to say, the third number by the first, and likewise the one dissemblant by the other that is to say, the fourth number by the second (which are dissemblant to the other two numbers) your two quotients will also be equall.

The style and manner of this rule, is thus: you must set down your three numbers in a certain order, as by example following

lowing shall appeare. And then you shall multiply the third number by the second, and the product or number that cometh of the same multiplication, you must divide by the first number, or otherwise, divide the first number by the second, and the quotient thereof shall be your divisor unto the third number, that is to say, the third number shall be divided by the quotient of the foresaid division, that is by the quotient of the first number divided by the second. Or otherwise, divide the second number by the first, and that number which cometh into your quotient, you shall multiply by the third number. And thus shall you have the fourth number which you seek for. And thus is your fourth number in such proportion unto the third, as your second number is unto the first.

Example.

If 8 be worth 12, what are 14 worth, after the rate? or else if 8, require 12, for his proportionall, what will 14 demand? The which three numbers may conveniently be set in such order, as hereafter doth appear.

If 8 make 12, what will 14 make? you must multiply the third number 14 by the second

ſecond which is 12, and thereof cometh 168 for the whole product of this multiplication: the which (as the rule teacheth) you muſt divide by the firſt number, that is to ſay, by 8, and thereof cometh 21. And ſo much are the 14 worth. This is the way which is moſt uſed.

```
                              14      8 - 12 - 14
                              12               12
  8 . : 12 . : 14 .           28              28
                              14.             14
  168|21.                    168             168(21
   88|                                        88
```

Otherwiſe divide 8 by 12, which you cannot doe, for they are $\frac{8}{12}$, wherfore abbrevy $\frac{8}{12}$, and they are $\frac{2}{3}$ for your quotient, then divide the third number 14, by the ſaid $\frac{2}{3}$ multiplying 14 by 3, which maketh 42: divide 42 by 2, and you ſhall have 21 as before.

```
 2
 4
 8
----
12
 6
 3
```

Or elſe divide the ſecond number 12, by the firſt number 8, and thereof cometh $1\frac{1}{2}$, the which $1\frac{1}{2}$, you ſhall multiply by the third number 14, and thereof will come 21: as is above ſaid: and thus muſt you do of al other, and although, that the numbers of this rule may be found in three differences, for ſometimes

ſometimes they are whole numbers and broken together, ſometimes broken numbers, and broken together, and ſometimes all whole numbers; if they be whole numbers, you muſt doe none otherwiſe, then you did in the laſt example. But in caſe they be broken numbers, or broken and whole uumbers together, the manner and way to do them, requireth a certain variation and difficulty, according to the variety of the numbers that ſhall be proponed: the which operation eaſily to doe, and unvariably, this rule teacheth.

The three numbers being ſet down according unto the order of the whole numbers aforeſaid, without any broken number, let 1 be put alwayes underneath every whole number, with a line between them fraction-wiſe, as thus $\frac{8}{1}$, and that 1 is denominator to every ſuch whole number. But when you have whole number and broken together, they muſt be reduced and added with their broken number, and if there be broken number without any whole number, the ſame broken muſt remain in their eſtate.

The rule of three in Fractions.

This being done, you ſhall multiply the denominator

denominator of the first number, by the numerator of the second, and multiply the product thereof againe by the numerator of the third number. And so shall you have the dividend, or number which must bee divided, then multiply the numerator of the first number, by the denominator of the second, and multiply again the product thereof by the denominator of the third number, and that which cometh of this multiplication shall be your divisor. Then divide the number which is to be divided by the divisor, and you shall find the fourth number that you seek. Of the which manner and fashions, of the rule of 3, are divers kinds, whereof the first is of three whole numbers, as was the last example, and here followeth the second.

15 2.300
2
600

If 15 pounds doe buy me 2 clothes, how many clothes will 300 pounds buy me of the same price, that the two clothes did cost: Set down your three numbers thus.

600 (40
15
1

The Example.

Lib. *Clothes.* *Lib.*
15. 2. 300.
2
600

~~600~~
~~155~~ (40
1

And

And then as you see, you must multiply the third number which is 300 li. by 2, which is the second number, and thereof cometh 600, the which 600 you must divide by the first number 15, and you shall find in your quotient 40, which is 40 clothes, and so many clothes shall you buy, for 300 li. as appeareth by practise here above written. And here you must mark that the first number and the third in this question be of one denomination, as before I have declared, and likewise the second and the fourth numbers which you have found, are of one semblance and likenesse, but in case that the first number and the third in any question be not of like denomination, you must in (working) bring them into one denomination, or nature, as in this example following. If 12 nobles doe gain me 6 French crownes, how many French crownes will 48 pounds gain me? Here you see that the denomination of the first number, is nobles, and the Denomination of the third, is pounds: wherefore, before you doe proceed to work by the rule of 3, you must first turn the pounds into nobles in multiplying 48 pounds by 3 nobles, & they make 144 nobles, for that there is in every pound of mony 3 nobles, or otherwise

wise if you will, you may bring the first number being 12 nobles, into pounds, by dividing them by 3, and thus shall your first and third numbers be brought into one denomination: then shall you set down your 3 numbers in order, thus.

If 12 nobles doe gain me 6 French crownes, what shall 144 Nobles gaine? the which 144 are the nobles which are in 48 li. Then multiply the third number 144. by the second number 6, and thereof cometh 864, the which you must divide by 12 Nobles, and thereof cometh 72 French Crownes.

And so many French Crownes will the 144 Nobles gain me.

Nobles.	*Crownes.*	*Nobles.*
12	6.	144.
144	20	Nobles.
6	864	(72
864	122	
	1	

There is yet a more exact way, whereby to work in this rule of three, which is thus. You must mark if the third and first numbers in the rule of three, may be both divided by one like divisor: the which after you have divided them, you shall write

F down

down each of the quotients orderly, in the said rule of 3, every one of them in his own place as though those were 2 of the numbers of your question, and not changing the middle number, that is to say, the second. As thus, if 50 Crownes doe buy me 44 yards of cloth, how many yards shall I have for 120 Crownes? Here you may see that the third and the first numbers may be divided by 10, which in the third number is found 12 times, and in the first 5 times. Wherefore you shall put 12, for the third number in the rule of three, instead of 120: and 5 for the first number instead of 50, and let 44 remain still in the middest, for the second number, after this sort as followeth, and then work by the rule as before.

Crowns.	*Yards.*	*Crowns.*
5.	44.	12.
	12.	
	88	3
	44	528 (105 $\frac{3}{5}$
	528	555

You must multiply 44 by 12 and thereof cometh 528: divide the same 528 by 5, and you shall find in your quotient 105, $\frac{3}{5}$ and even so many yards should you have found, if

if you had wrought the rule of three, by the first numbers proposed. There is yet certain other varieties, in working by the rule of three, but for that they require the knowledge of fractions, and because they are not so easie as this first way, which is common, therefore content your selves with this same, untill you have learned the fractions, the which by Gods help I intend to set forth in the second part of this book incontinently after that I have first taught you the backer rule of 3.

Of the backer rule of three.

The backer rule of three is so called, because it requireth a contrary working to that, which the rule of three direct doth teach, whereof I have now treated. For in the direct rule of three, the greater the third number is, so much the greater will the fourth be. But here in this backer rule, it is contrariwise, for the greater the third number is, so much lesser will the fourth bee. Then, whereas in the rule of three direct, the third number is multiplyed by the second, and the product thereof divided by the first: Here you must multiply the second number by the first and divide the product of the same by the third, and the number

which cometh in the quotient, answereth to the question. For such practise cometh oftentimes in use: In such sort that if you should work the same by the rule of three direct, and not to have a regard unto the Proposition of the question, you should then commit an evident and open error.

Example.

If 15 shillings worth of wine, will serve for the ordinary of 46 men, when the Tun of wine is worth 12 pounds: for how many men will the same 15 shillings worth of wine suffice, when the Tun of wine is worth but 8 pounds? It is certain, that the lower the price is, that the Tunne of wine doth cost, and so many more persons, will the said 15 shillings in wine suffice. Therefore, set down your numbers thus: If 12 pounds suffice 46 men, for how many men will 8 pounds suffice? you must multiply 46 by 12, & thereof cometh 552, the which 552, you shall divide by 8, and thereof cometh 69, and unto 69 men, will the said 15 shillings worth in wine suffice, when the Tunne of wine is worth but 8 pounds, as hereafter doth appear by practise.

Lib.

Lib.	Men.	Lib.
12.	46.	8.
	12.	7.
	92.	552 (69.
	46.	83
	552	

2. Likewise a messenger maketh a journey in 24 dayes, when the day is but 12 houres long: in how many dayes shall hee make the same journy, when the day is 16 houres in length? Here you must perceive, that the more houres there are in a day, the fewer dayes will the messenger be in going his journy. Therefore write downe your number thus, as here you may see.

Houres.	Dayes.	Houres.
12.	24.	16.
	12.	
	48.	288
	24.	166
	288.	1(18

H 8 H
12 24 16
12
48
24
(18
288
166

And then multiply 24 dayes by 12 hours and thereof cometh 288. divide the same 288, by the third number 16, and you shall finde 18, the which is 18 dayes, and in so many dayes will the messenger make his

16
8
128

iourney, when the day is 16 houres long.

Likewiſe when the buſhell of wheat doth coſt 3 ſhillings, the peny loaſe of bread weigheth 4 li.

I demand what the ſame peny loaf ſhall weigh, when the buſhell of wheat is worth but 2 s. Here is to be conſidered, that the better cheap the wheat is, the heavier ſhall the peny loaf weigh, and therefore write down your three numbers thus.

Shil.	*Lib.*	*Shil.*		
3,	4.	2,		
	3.		12	*Lib.*
	12		2	(6.

Then multiply 4 li. which is the ſecond number, by the firſt number 3, and they make 12, the which 12 you ſhall divide by the third number: and thereof cometh 6 li. and ſo much muſt the peny loafe of bread weigh, when the buſhell of wheat is worth but 2 ſhillings, as may appear. And now according to my former promiſe, ſhall follow the ſecond part of Arithmetick, which teacheth the working by Fractions.

Here endeth the firſt part of *Arithmetick.*

The ſecond part of Arithmetick, which treateth of Fractions or broken Numbers.

The firſt Chapter treateth of *Fractions* or broken numbers, and the difference thereof.

A Fraction or a broken number is as much, as a part or many parts of 1, whereof there are two numbers with a line betweene them both, that is to ſay, the one which is above the line, is called the numerator, and the other underneath the line, is called the denominator, as by example, 3 quarters is called a Fraction, which muſt be ſet down thus $\frac{3}{4}$, whereof 3 which is the higher number above the line is called the numerator, and 4 wich is under the line, is called the denominator. And it is alwayes convenient that the numerator be leſſe in number, then the denominator. For if the numerator, and the denominator be equall numbers, then ſhall they repreſent a whole number thus, as $\frac{1}{1}$, $\frac{2}{2}$, $\frac{3}{3}$,

which are whole numbers: by reason that the numerators of these, and all such like, may be divided by their denominators, and their quotients will alwayes be but 1. But in case that the numerator of any fraction doe exceed his denominator, then it is more then one whole: as $\frac{29}{18}$, is more then a whole number by $\frac{11}{18}$. And this is commonly called an improper fraction: other definition doth not hereunto appertain. Furthermore it is to be understood that when the numerator is just the half of the denominator, then the same broken number is the just halfe of 1 whole, as $\frac{6}{12}$, $\frac{7}{14}$, $\frac{8}{16}$, $\frac{9}{18}$, and other like, are the halfes of one whole number whether it be of mony, of measure, of weight, or any other thing: whereof doth grow and come forth 2 progressions naturall: the one progreding by augmenting or encreasing, as these.

$\frac{1}{2}$, $\frac{2}{3}$, $\frac{3}{4}$, $\frac{4}{5}$, $\frac{5}{6}$, $\frac{6}{7}$, $\frac{7}{8}$, $\frac{8}{9}$, $\frac{9}{10}$, &c.

And they doe proceed infinitely, and will never reach to make a whole number, thus, $\frac{1}{1}$. And the other progression, doth progredy by diminishing or decreasing, as thus.

$\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, $\frac{1}{5}$, $\frac{1}{6}$, $\frac{1}{7}$, $\frac{1}{8}$, $\frac{1}{9}$, $\frac{1}{10}$. &c.

And these doe proceed infinitely, and shall never come to make 0, which signifieth nothing, but shall ever retain some

certain

certain value of an unit, whereby it doth appear that Fractions or broken numbers are infinite.

The second Chapter treateth of the reducing or bringing together of two Fractions or many of divers denominations, unto Fractions of one like denomination.

Reduction, is as much as to reduce and bring together, or to put two or many numbers, being of divers denominations the one from the other, into fractions of one denomination, in reducing them unto a common denominator, and the reason hereof is, for because the diversity and difference of the broken numbers do come of the denominators part, or of divers denominators, & for the understanding hereof, there is a generall rule whose operation or working is thus. Multiply the denominators of the fractions, the one by the other, and so you shall have a new denominator common to all the fractions, the which denominator you must divide by the particular denominators of every of the said fractions, and multiply every quotient by his

his own numerator, and so you shall have new numerators, for the numbers which you would reduce, as appeareth by this example following.

Reduction in common denomination.

Reduction 1. 1. If you will reduce $\frac{2}{3}$ and $\frac{4}{5}$ together, first make a crosse between the 2 fractions as here you see, and then you must multiply the two denominators the one by the other, that is to say, 3 by 5 maketh 15, which is your common denominator, set that under the crosse, then divide 15 by the denominator 3, and you shall have 5, which multiply by the numerator 2, & you shall find 10, set that over the $\frac{2}{3}$ and they are $\frac{10}{15}$, for the $\frac{2}{3}$. Afterwards divide 15 by the denominator 5: and thereof cometh 3, the which multiply by the numerator 4, and you shall find 12, which set over the head of the $\frac{4}{5}$ and they make $\frac{12}{15}$ for the $\frac{4}{5}$: as appeareth more plainer above in the margent.

$$\begin{array}{ccc} 10 & & 12 \\ \frac{2}{3} & \mathbf{X} & \frac{4}{5} \\ & 15 & \end{array}$$

Reduction 2. 2. If you will reduce $\frac{1}{2}$, $\frac{2}{3}$, $\frac{3}{4}$, $\frac{5}{6}$, together you must multiply all the denominators the one by the other, that is to say, 2 by 3 maketh 6: then 6 by 4 amounteth to 24. Last of all

all 24 by 6, and thereof cometh 144, for the common denominator. Then for the first fraction which is $\frac{1}{2}$ divide 144, by the denominator 2, and thereof cometh 72, the which multiply by the numerator 1, & it is still 72, set that over the $\frac{1}{2}$, and that is $\frac{72}{144}$, for the $\frac{1}{2}$: Then divide 144 by the second denominator 3, and thereof cometh 48: the which multiply by the second numerator 2, and they are 96, which set over the $\frac{2}{3}$ and they make $\frac{96}{144}$, for the $\frac{2}{3}$: Then divide 144 by the third denominator 4, and thereof cometh 36, the which multiply by the third numerator 3, and they make 108: which set over the $\frac{3}{4}$, & they are $\frac{108}{144}$ for the $\frac{3}{4}$.

Finally divide 144 by the last denominator 6, and thereof cometh 24: The which multiply by the last numerator 5, and thereof cometh 120. Which set over the $\frac{5}{6}$, and they are $\frac{120}{144}$, for the $\frac{5}{6}$, as appeareth here by practise.

```
 72|96|108|120  |    2|144  (72| 2
 ½, ⅔, ¾, ⅚     |    3| 22    1|144     (48
      144       |    6|      72| 22       2
                |    4|        |         96
                |   24|2         2
                |    6|144  (36|144     (24
                |  144| 44    3| 66       5
                |     |     108|        120
```

Reduction of broken numbers of broken.

If you will reduce the broken of broken together, as thus, the $\frac{1}{2}$ of $\frac{1}{4}$, of $\frac{4}{5}$, you must multiply all the numerators, the one by the other, to make one broken number of the three broken numbers: that is to say, 2 by 1, maketh 2: and then 2 by 4 maketh 8: which 8 is your numerator. Then multiply the Denominators the one by the other, that is to say, 3 by 4, maketh 12, and then 12 by 5, maketh 60 for your denominator, set 8 over 60, with a line between them, and they be $\frac{8}{60}$ which being abbreviated by $\frac{2}{15}$, and so much are the $\frac{2}{3}$ of $\frac{1}{4}$, of $\frac{4}{5}$ as appeareth in the margent.

8
2, 1, 4,
3 4 5
60.

Another example of the same Reduction, and of the second Reduction.

Reduction. 4.

If you will reduce $\frac{2}{3}$ of $\frac{1}{4}$, of $\frac{4}{5}$, the $\frac{3}{4}$ of $\frac{5}{7}$: And the $\frac{1}{2}$, of the $\frac{1}{2}$, of the $\frac{2}{3}$ of $\frac{1}{3}$. First it behoveth you of every party of the broken numbers, to make of each of them one broken: as by the third Reduction is taught: that is to say, in multiplying the numerators by numerators, and denominators by deno-

denominators: First for the first part which is $\frac{2}{3}$ of $\frac{1}{4}$, of $\frac{4}{5}$, you must as is before said, multiply 2 by 1, and then by 4, and you shall have 8 for the numerator, likewise multiply 3 by 4, and the product by 5, and you shall have 60 for the denominatoe: so they make $\frac{8}{60}$ which being abbrevyed are, $\frac{2}{15}$ for the first part, that is to say, for the $\frac{2}{3}$ of $\frac{1}{4}$ of $\frac{4}{5}$: secondly for the $\frac{3}{4}$ of $\frac{5}{7}$ multiply likewise the numerator 3 by 5 maketh 15, for the numerator. And multiply 4 by 7 maketh 28, for the denominator. And then they be $\frac{15}{28}$ for the second part: that is to say, for the $\frac{3}{4}$ of $\frac{5}{7}$. Thirdly, for the $\frac{1}{2}$ of $\frac{1}{2}$, of $\frac{2}{3}$, of $\frac{1}{3}$, you must multiply the numerators the one by the other, that is to say, 1 by 1, and then by 2, and last by 1, and all maketh but 2, for the numerator: likewise multiply the denominators 2 by 2, maketh 4, and 4 by 3 maketh 12, and then 12 by 3 maketh 36, for the denominator: and they are $\frac{2}{36}$, which being abbrevied maketh $\frac{1}{18}$ for the third part, that is to say, for $\frac{1}{2}$ of the $\frac{1}{2}$, of $\frac{2}{3}$ of $\frac{1}{3}$. Last of all take $\frac{2}{15}$, the $\frac{15}{28}$, and the $\frac{1}{18}$, and reduce them according to the order of the second reduction, and you shall find $\frac{1008}{7560}$ for the $\frac{2}{15}$. And $\frac{4050}{7560}$ for the $\frac{15}{28}$. And $\frac{420}{7560}$ for the $\frac{1}{18}$: and thus are broken numbers of broken reduced, as appeareth by practise.

8

$\frac{2}{3}$ $\frac{1}{7}$ $\frac{4}{5}$

60

2	3	2
1	4	8
2	12	60
4	5	15
8	60	

15

$\frac{3}{4}$ $\frac{1}{7}$

28

2

$\frac{1}{3}$ $\frac{1}{3}$ $\frac{2}{3}$ $\frac{1}{2}$

36

2	2	1
1	2	2
1	4	36
2	3	18
2	12	
1	3	
2	36	

1008 4050 420

$\frac{2}{15}$ $\frac{15}{28}$ $\frac{1}{18}$

7560

15
28
120
30
420
18
3360
420
7560

202
7560 (504
1555
22

2
1008

15
390
7560 (270
2888
22

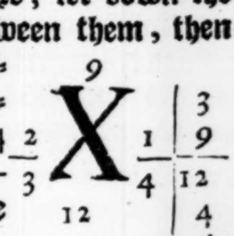
15
1350
270
4050

2
330
7560 (420
1888
22

1
420

Reduction of broken numbers, and the parts of broken together.

If you will reduce $\frac{1}{3}$, and the $\frac{1}{2}$ of $\frac{1}{3}$ together, to bring them into one broken number; you must first set down the $\frac{1}{3}$ and $\frac{1}{2}$ as appeareth in the margin with a crosse between them, and then multiply the two denominators, the one by the other, that is to say, 2 by 3, maketh 6, set that under the crosse, then multiply the first Numerator 1, by the last denominator 2, and that maketh 2: unto the which adde the last numerator 1, and they be 3, which set above your crosse, so you shall find: that the $\frac{1}{3}$ and the $\frac{1}{2}$ of $\frac{1}{3}$, doe make $\frac{3}{6}$, which being abbreviated doth make $\frac{1}{2}$ which is as much, as the $\frac{1}{3}$ and the $\frac{1}{2}$ of $\frac{1}{3}$, being reduced into one fraction. Likewise if you will reduce the $\frac{2}{3}$ and $\frac{1}{4}$ of $\frac{1}{3}$, you must doe as before, set down the $\frac{2}{3}$ and $\frac{1}{4}$, with a crosse between them, then multiply the two denominators the one by the other, that is to say 3 by 4 maketh 12: which set under the crosse, as you see



in

in the margent: and then multiply the first numerator 2, by the last denominator 4, and thereof cometh 8, whereunto adde the last numerator 1, and that maketh 9, which 9 set over the Crosse: so shall you find that the $\frac{2}{3}$ and the $\frac{1}{4}$ of $\frac{1}{3}$, are worth $\frac{9}{12}$, the which abbrevied doe make $\frac{3}{4}$, as appeareth by example in the margent.

Reduction of whole numbers and broken together into a Fraction, the Fraction which is called an improper Fraction.

Reduction. 6.

If you will reduce whole number and broken into broken, you shall reduce the whole number into broken, as by this example may appeare: if you will reduce $17\frac{5}{8}$, into a broken number, first you must multiply the whole number 17 by the denominator of the broken, which is 8, in saying 8 times 17, doe make 136, unto the which you must adde the numerator of $\frac{5}{8}$ which is 5, and all amounteth to 141, which set over $\frac{5}{8}$, with a line between them, and they will be $\frac{141}{8}$ so much is $17\frac{5}{8}$, worth in an improper fraction, as appeareth here by practise.

$$\begin{array}{r|l|} 17 & 141 \\ 8 & \overline{17\frac{5}{8}} \\ \hline 136 & \\ 5 & \\ \hline 141 & \end{array} \qquad \text{maketh } \frac{141}{8}$$

In case you have whole number and broken, to be reduced with broken, you must bring the whole number into his broken, in multiplying it by the denominator of the broken number going therewith, and adde thereunto the numerator of the said broken number, as in the last example is declared, & then reduce that broken number with the other broken, as here appeareth by this example. Reduce 10, $\frac{2}{3}$ and $\frac{4}{7}$ together, first bring 10$\frac{2}{3}$ all into thirds, as it is taught by the first reduction, and you shall find $\frac{32}{3}$, then reduce the $\frac{32}{3}$ and $\frac{4}{7}$ together, by the first reduction, and you shall find $\frac{224}{21}$ for the $\frac{32}{3}$: and $\frac{12}{21}$ for $\frac{4}{7}$ as appeareth here by practise.

$$\begin{array}{r|l|} 32 & 224 \\ \hline 10\frac{2}{3} & \overline{3\frac{2}{3}} \end{array} \quad \mathbf{X} \quad \frac{12}{\frac{4}{7}} \qquad \begin{array}{cc} 32 & 4 \\ 7 & 3 \\ \hline 224 & 4 \end{array}$$

$$21$$

Also in case you have in both parts of your reduction, as well whole number as broken, you must alwayes put the whole

 of

of each part into his broken as by the 6 reduction is taught.

Example.

If you will reduce 12 $\frac{1}{4}$ with 14 $\frac{2}{3}$ to bring them into one denomination, first bring the 12 $\frac{1}{4}$ all into fourthes, and you shall find $\frac{49}{4}$: then likewise reduce 14 $\frac{2}{3}$, all into thirds, and you shall have $\frac{44}{3}$ for the 14 $\frac{2}{3}$: then reduce $\frac{49}{4}$ and $\frac{44}{3}$, together, by the order of the first reduction, and you shall find $\frac{147}{12}$ for the $\frac{49}{4}$. And $\frac{176}{12}$ for the $\frac{44}{3}$: as here by practise doth plainly appeare.

49	44
12 $\frac{1}{4}$	14 $\frac{2}{3}$

147 X 176

$\frac{49}{4}$ $\frac{44}{3}$

12

The third Chapter treateth of abbreviation of one broken number into a lesser broken.

Abbreviation is as much as to set down, or to write a broken number by figures of lesse signification, and not diminishing the value thereof. The which to doe, there is a rule whose operation

peration is thus divide the numerator and likewise the denominator, by one whole number, the greatest that you may find in the same broken number, and of the quotient of that numerator, make it the numerator, and likewise of that of the denominator make it your denominator, as by example.

1. If you will abbreviate $\frac{54}{81}$ you shall understand that the greatest whole number that you may take, by the which you may divide the numerator and the denominator is 27, which is the half of the denominator, and that is a whole number, for you cannot take a whole number out of the denominator 81, which will divide both the numerator and the denominator, but that there will be either more or lesse then a whole number, therefore if you divide 54 by 27, you shall find in the quotient 2 for the numerator: likewise if you divide 81 by 27 you shall have in the quotient 3 for the denominator: then

$$\frac{54}{81}$$

~~1~~0	
~~5~~4	(3
~~2~~7	

 put

put 2 over the 3, with a line between them, and you shall find $\frac{2}{7}$, and thus by this rule the $\frac{14}{81}$ are abbrevied unto $\frac{2}{3}$: as appeareth in the margent, and so is to be understanded of all other.

$\frac{2}{3}$

$\frac{28}{81}$ (3 $\frac{}{27}$

The form and manner how to ~~find~~ the greater number, by the which you may wholly divide the numerator and denominator, (to the end ye may abbreviate them) is thus.

First divide the denominator by his numerator, and if any number doe remain, let your divisor be divided by the same number, and so you must continue until you have so often times divided, that there may nothing remain, then it is to be understood, that your last divisor (whereat you did end, and that o did remain after your last division) is the greatest number, by the which you must abbreviate, as you did in the last example. But in case that your last divisor be 1, it is a token that the same number cannot be abbrevied to any lower fraction then you

you find it at the first. Example of $\frac{54}{81}$ divide 81, which is the denominator by 54 which is his his numerator, and there resteth 27, then divide 54 by 27, and there remaineth a 0, which is nothing, wherefore your last divisor 27 is the number by the which you must abbreviate $\frac{54}{81}$: as in the last example is specified.

¶ *Another manner of Abbreviation.*

2. Mediate the numerator, and also the denominator of your Fraction in case the numbers be even, that is to say, take alwayes the halfe of the numerator, and likewise of the denominator, and of the mediation or halfe of the numerator, make it your numerator, also of halfe the denominator make your denominator, and so continue as often as you may in taking alwayes the halfe of the numerator, and likewise of the denominator: or else see if you may abbreviate the numbers which doe remain, by 3, by 4, by 5, 6, 7, 8, 9, or by 10 : for you must abbreviate them as often as you can by any of the said numbers. And it is to be noted, that with whatsoever number of these, you doe abbreviate the numerator of your fraction, by the same you must abbreviate likewise the denominator, so continuing untill they can no more be abbrevied.

And it is to be understood, that if the Numerator and the Denominator bee even numbers, as you may know when the first figure is an even number, or a o then may you perceive if both the Numerator and the Denominator may be abbreviated by 10, by 8, by 4, or by 2: albeit that sometimes they may be abbreviated by 3. And if they be odde numbers, then must you consider if they may be abbreviated by 9, by 7, by 5. or by 3: but when the first number as well of the numerator, as of the denominator are even numbers, then may you well know that such numbers may be abbreviated by 2, as is aforesaid. And if you adde the figures of the numerator together, in such manner as you doe in making the proofe by 9 in whole numbers: that is, if you find 9: it appeareth that you may abbreviate that number by 9 and likewise by 3, and sometimes by 6, if you find 6 it may be abbreviated by 6, and alwayes by 3 if you find 3. it is a signe that that you abbreviate by 3. And by whatsoever number that you doe abbreviate the numerator, by the same must you abbreviate likewise the denominator, and if the first figures of the same number be 5 or o, you may abbreviate them by 5, but if the first figures be both o, they may be abbreviated by 10: in

cutting

cutting away the 2 Ciphers thus, as $\frac{2|0}{5|0}$ which maketh $\frac{2}{5}$, & sometimes by 100, thus, as $\frac{1|00}{3|00}$, in cutting away the foure Ciphers after this sort, $\frac{1|00}{3|00}$ and then the $\frac{100}{300}$ doe make $\frac{1}{3}$, and after this manner have I set here divers examples although that all broken numbers cannot be abbreviated by this rule, yet all fractions may be well abbreviated by the first rule aforesaid.

Abbreviated.

$\frac{3840}{7680}$	by 10.	$\frac{1890}{4725}$	by 9.
$\frac{384}{768}$	by 8.	$\frac{210}{525}$	by 7.
$\frac{48}{96}$	by 6.	$\frac{30}{75}$	by 5.
$\frac{8}{16}$	by 4.	$\frac{6}{15}$	by 3.
$\frac{4}{8}$	by 2.	$\frac{2}{5}$	
$\frac{1}{2}$			

3. Furthermore you shall understand that sometimes it happeneth that all the figures of the numerator are equall unto them of the denominator, which when it so happeneth you may then take one of them of the numerator, and also one of them of the denominator, and it shall be abbreviated as $\frac{555}{888}$, being abbreviated after this manner cometh to $\frac{5}{8}$. And yet it happeneth sometimes, that two or many figures of the numerator are

proportioned unto ſo many figures of their denominators, and that the other figures of the ſame number are the figures one to the other in this proportion following. Then may you take two or more figures, as well of the numerator, as of the denominator, and by this manner the ſame number ſhall bee abbreviated, as $\frac{4747}{5959}$ being abbreviated by this rule, doe come to $\frac{47}{49}$.

4. Alſo it happeneth ſometimes, that you would abbreviate one number unto the ſemblance or likeneſſe of another: And for to know if the ſame may be abbreviated, and alſo by what number it may be abbreviated, you muſt divide the numerator of one number by the numerator of the other: and likewiſe the denominator of the one, by the denominator of the other, for in caſe that after every diviſion there doe remain 0, and that the two quotients be equall, then is one of them the number by the which the ſaid fraction muſt be abbreviated, as by example of $\frac{115}{207}$. I would know if they may be abbreviated unto $\frac{5}{9}$, and for to doe this, you muſt divide 115 by 5 and you muſt divide 207 by 9, and there will come into both the quotients 23: by the which it appeareth that this number may be abbreviated by 23.

	~~10~~			
$\frac{119}{207}$	~~11~~5		~~20~~	
$\frac{5}{0}$	~~55~~	(23	~~207~~	
			~~99~~	23

The fourth Chapter treateth of the Adding of two or many broken numbers together, as by example.

FOr to adde Fractions or broken numbers together, there is a generall rule which is thus. If the numbers bee of unlike denominations the one to the other, you must reduce them into a common denomination by the doctrine of the first reduction: and when you have reduced them you must then adde both the numerators together, and set the product of the said addition over the crosse, and divide the same Numerator by the common denominator, as by this example following.

1. If you will add $\frac{2}{3}$ with $\frac{3}{4}$, you must first reduce the two fractions both into one denomination, according to the order of the first reduction, that is to say, in multiplying the denominator of the first fraction which is 3, by the Denominator of the other

other fraction which is 4, and they make 12 for your common denominator: the which 12 you shall set under the crosse, then multiply the first numerator 2 by the last denominator 4 and thereof commeth 8, which set over the $\frac{2}{3}$, and then multiply the last numerator 3, by the first denominator 3, and thereof commeth 9, which you must set over the $\frac{3}{4}$: then adde the numerator 8, with the numerator 9, and they make 17, which set over the crosse, and then your fraction will be $\frac{17}{12}$: which is the addition of the $\frac{2}{3}$ with $\frac{3}{4}$. And because the numerator 17, is greater then his denominator 12, therefore you must divide 17 by 12: and thereof will come 1, and 5 remaining, which 5 you must set apart, and 12 under the same, with a line between them, and they are worth $1\frac{5}{12}$, and so much are the $\frac{2}{3}$ added with $\frac{3}{4}$ as doth appeare.

17

$\frac{8}{\frac{2}{3}}$ X $\frac{9}{\frac{3}{4}}$

12

5
$\cancel{17}$
$\cancel{12}$ ($1\frac{5}{12}$

Addition in broken numbers.

2. Also if you will adde $\frac{1}{2}$, $\frac{2}{3}$, $\frac{3}{4}$, and $\frac{4}{5}$ together, you must first adde the $\frac{1}{2}$ and $\frac{2}{3}$, together according to the doctrine of the last rule, and you

you shall find $\frac{7}{8}$: then adde $\frac{3}{4}$ and $\frac{4}{5}$ together by the said last rule, and they make $\frac{31}{20}$. Then finally adde the $\frac{7}{8}$ (which came of the $\frac{1}{2}$ and $\frac{2}{3}$ added together) with $\frac{31}{20}$, which came of the $\frac{3}{4}$ and $\frac{4}{5}$ added together, and you shall find by the aforesaid Addition that they amount unto $\frac{326}{120}$. Wherefore divide 326 by 120 & thereof commeth 2 and 86 remaineth which is $\frac{86}{120}$ of one whole, and they being abbreviated doe make $\frac{43}{60}$ and thus the $\frac{1}{2}$, $\frac{2}{3}$, $\frac{3}{4}$, and $\frac{4}{5}$ being added together doe amount to 2 and $\frac{43}{60}$ as here under doth appeare.

3 4 15 16
7 31
$\frac{1}{2}$ X $\frac{2}{3}$ $\frac{3}{4}$ X $\frac{4}{5}$
6 20

140 186
326
$\frac{7}{6}$ X $\frac{31}{20}$
120

~~1~~8
~~3~~~~2~~6
~~1~~2~~0~~ (2 $\frac{43}{60}$

5
12 (6
x
5 (2
1

¶ *Addition of broken number of broken.*

3. Furthermore, if you will add the broken numbers

numbers of broken together as to adde the $\frac{2}{3}$ of $\frac{3}{4}$ of $\frac{4}{5}$ with the $\frac{5}{8}$ of $\frac{1}{2}$ of $\frac{5}{8}$: first you must reduce the numbers according to the order of the fourth reduction, in multiplying the numerators of the first 3 fractions, the one by the other, and of the product make your numerator, and likewise you must multiply the denominators of the foresaid three fractions, the one by the other, and of the product make your denominator, and you shall finde $\frac{24}{60}$ for the first three broken numbers, the which being abbrevied doe make $\frac{2}{5}$ then reduce the other 3 fractions, by the said fourth reduction, in multiplying the numerators by numerators, and denominators, by denominators, as you did by the first 3 broken numbers aforesaid, and you shall finde $\frac{25}{98}$ then must you adde the $\frac{2}{5}$ which came of the first 3 broken numbers, and $\frac{25}{98}$ which are come of the last 3 fractions, both together, by the instruction of the first Addition: an~~ you shall find $\frac{317}{480}$: which cannot be abbrevied, but is the just product of the addition: so much are $\frac{2}{3}$ $\frac{3}{4}$ of $\frac{4}{5}$ added with the $\frac{5}{8}$ of $\frac{1}{2}$ of $\frac{5}{8}$ as hereafter by practise doth evidently appeare.

$$\frac{24}{\frac{2}{3},\ \frac{3}{4},\ \frac{4}{5}}\ \text{———}\ 60 \qquad \frac{2}{5} \qquad \frac{25}{\frac{5}{6},\ \frac{1}{2},\ \frac{5}{8}}\ \text{———}\ 96$$

317

$$\begin{array}{ccccc} 192 & & 125 & & \\ \frac{2}{5} & \times & \frac{25}{96} & & \frac{317}{480} \\ & 480 & & & \end{array}$$

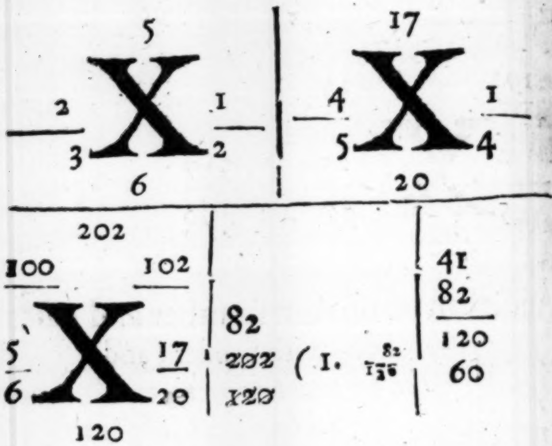
Addition of broken number and parts of broken, with broken, and *the parts of broken together.*

4. Likewise if you will adde the $\frac{2}{3}$ and the $\frac{1}{2}$ of $\frac{1}{3}$, with the $\frac{4}{5}$ and $\frac{1}{4}$ of $\frac{1}{5}$, you must reduce the $\frac{2}{3}$ $\frac{1}{2}$ first into one fraction by the doctrine of the fift reduction, and thereof commeth $\frac{5}{6}$, for the $\frac{2}{3}$ and $\frac{1}{2}$ of the said thirds: then reduce the $\frac{4}{5}$ and $\frac{1}{4}$ by the said fift reduction, and thereof commeth $\frac{17}{20}$.

Last of all adde the $\frac{5}{6}$ and $\frac{17}{20}$ together according to the first rule of Addition: and you shall find $\frac{202}{120}$ which being divided bringeth 1, & $\frac{82}{120}$ part remaining, which abrevied maketh $\frac{41}{60}$ and thus you doe perceive that the $\frac{2}{3}$ and $\frac{1}{2}$ of $\frac{1}{3}$, added with the $\frac{4}{5}$ and $\frac{1}{4}$ of $\frac{1}{5}$,

doe

doe amount unto 1 $\frac{41}{60}$ as hereafter by practise doth plainely appeare.



Addition of whole number and broken with whole number *and broken.*

5. Also if you will adde 12 $\frac{4}{5}$ with 20 $\frac{5}{6}$ you may (if you will) adde 12 and 20 together, and they make 32, the which you shall set apart and then adde the two broken numbers together, that is to say $\frac{4}{5}$ and $\frac{5}{6}$ by the order of the first addition, and they make $\frac{49}{30}$: therefore divide 49 by 30, and thereof commeth 1 and $\frac{19}{30}$ parts remaine, which 1 you must adde unto the 32, which

which were put apart, and the whole addition will be 33 $\frac{19}{30}$. Or otherwise, you may reduce 12 $\frac{4}{5}$ into the likenesse of a Fraction by the order of the sixth reduction, & they wil be $\frac{64}{5}$ and likewise by the same reduction, reduce 20 $\frac{5}{8}$ and they be $\frac{125}{8}$, then adde $\frac{64}{5}$ with the $\frac{125}{8}$, by the first addition, and you shall finde $\frac{1009}{30}$ Therefore divide 1009 by 30, and thereof commeth 33 $\frac{19}{30}$ as before, and as by practise of the same both wayes, doth hereafter appeare.

12 $\frac{4}{5}$
20 $\frac{5}{8}$
1
33 $\frac{19}{30}$

49
24 X 25
$\frac{4}{5}$ $\frac{5}{8}$
30

1
49 (1 $\frac{19}{30}$
30

64 125
12 $\frac{4}{5}$ 20 $\frac{5}{8}$

1009
384
64 X 625
5 125
6
30

11
1009 (33 $\frac{19}{30}$
330

The

The fift Chapter treateth of Substraction in broken numbers.

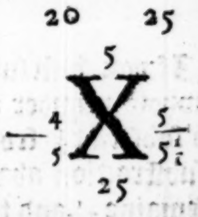
1 IF you will substract $\frac{2}{3}$ from $\frac{3}{4}$, you must first reduce both the fractions, into a common denomination, by the doctrine of the first reduction, and you shall finde $\frac{8}{12}$ for the $\frac{2}{3}$, and $\frac{9}{12}$ for the $\frac{3}{4}$. Therefore abate the numerator 8 from the numerator 9, and there will remaine 1, which 1 you must set over the crosse, and the same is $\frac{1}{12}$, and so much is the rest of that substraction, as may appeare here by practise.

$$\begin{array}{ccccc} & 8 & & 9 & \\ & & 1 & & \\ \frac{2}{3} & & \times & & \frac{3}{4} \\ & & 12 & & \end{array}$$

2. But if you have a broken number to be substracted from a whole number, you must borrow 1 unit of the whole number, and resolve it into a fraction of like denomination, as is that fraction, which you would abate from the same whole number, and then abate the said fraction there from, and you shall find what doth remain, as by this example. If you abate $\frac{4}{5}$ from 8, you must

must borrow one of the said 8, and resolve it into fifties like unto the fraction, because it is $\frac{4}{5}$, & that 1 will be 5 fifts thus $\frac{5}{5}$ therfore abate $\frac{4}{5}$ from $\frac{5}{5}$ and there will remaine $\frac{1}{5}$, and substract the 1 which you borrowed from 8, and there doth remaine 7, & the $\frac{1}{5}$ also which remained after the said $\frac{4}{5}$ were abated. Thus the $\frac{4}{5}$ being substracted from 8, doth leave $7\frac{1}{5}$ as by practise doth plainely appeare.

8
1
$7\frac{1}{5}$



Or otherwise you shall put 1 under 8 with a line betweene, and that will be $\frac{8}{1}$: then set downe the $\frac{4}{5}$ and the $\frac{8}{1}$ with a crosse betweene them, then you must reduce them into one denomination by the first reduction, and you shall finde 4 over the $\frac{4}{5}$, and 40 over the $\frac{8}{1}$ then substract the said 4 from 40, and there will remaine 36, the which you shall set over the crosse, and they doe make $\frac{36}{5}$. Likewise you must multiply the denominator 5 by 1, maketh 5, set that under the crosse, then divide 36 by 5 and thereof will come $7\frac{1}{5}$ as before, for the rest of that

P sub-

ſubſtraction, as here by practiſe appeareth.

$$\begin{array}{ccccc} & \overline{4} & & \overline{40} & \\ & & 36 & & \\ \frac{4}{5} & & \times & & \frac{8}{1} \end{array}$$

$$\begin{array}{r} 40 \\ 4 \\ \hline 36 \end{array}$$

$$\begin{array}{ccc} 5 & & 1 \\ & & \cancel{36}\ (7\frac{1}{5} \\ & & 5 \end{array}$$

3. If you will ſubſtract broken number from whole number and broken: as if you would ſubſtract $\frac{3}{4}$ from 6 $\frac{5}{8}$, you may by the firſt ſubſtraction abate $\frac{3}{4}$ from $\frac{5}{8}$ and there will remaine $\frac{1}{12}$, and the 6 doth ſtill remaine whole, becauſe the $\frac{3}{4}$ may well be abated from the $\frac{5}{8}$, and thus $\frac{3}{4}$ being abated from 6 $\frac{5}{8}$ leaveth 6 $\frac{1}{12}$ as appeareth by practiſe.

$$\begin{array}{cc} 6 & \frac{5}{8} \\ 0 & \frac{3}{4} \\ \hline 6 & \frac{1}{12} \end{array}$$

$$\begin{array}{ccccc} & \overline{18} & & \overline{20} & \\ & & 2 & & \\ \frac{3}{4} & & \times & & \frac{5}{6} \\ & & 24 & & \end{array} \qquad \frac{1}{12}$$

Likewiſe if you will abate $\frac{2}{3}$ from 14 $\frac{2}{5}$, you muſt firſt reduce 14 $\frac{2}{5}$ all into fifts by the 6 reduction, and they be $\frac{72}{5}$ then reduce $\frac{2}{3}$ and

$\frac{2}{3}$ and $\frac{72}{5}$ into a common denomination, by the first reduction, and you shall finde $\frac{10}{15}$ for the $\frac{2}{3}$ and $\frac{216}{15}$ for the $\frac{72}{5}$: then substract the numerator 10 of the first fraction, from the numerator 216 of the second fraction, and there remaineth $\frac{206}{15}$. Therefore divide 206 by 15, and thereof commeth 13 $\frac{11}{15}$, and so much remaines of this substraction, as may appeare in the example following.

10 216

72 206

14 $\frac{2}{5}$

$\frac{2}{3}$ X $\frac{72}{5}$

15

1
21
25
206 (13 $\frac{11}{15}$
155
1

4. If you will substract whole number and broken from whole and broken, as thus, if you will substract 9 $\frac{1}{4}$, from 20 $\frac{1}{2}$, you must reduce 9 $\frac{1}{4}$ into fourths, and likewise the 20 $\frac{1}{2}$ into halfes, by the first reduction: and you shall finde $\frac{37}{4}$ for the 9 $\frac{1}{4}$: and $\frac{41}{2}$ for the 20 $\frac{1}{2}$. Then reduce $\frac{37}{4}$, and $\frac{41}{2}$ into one denomination, according unto the first redu-

ction and you ſhall find $\frac{74}{8}$ for the $\frac{37}{4}$, and $\frac{164}{8}$ for the $\frac{41}{2}$ then abate the numerator of $\frac{74}{8}$ which is 74, from 164 which is the numerator of $\frac{164}{8}$ and there remaineth $\frac{90}{8}$, then divide 90 by 8, and thereof commeth 11 $\frac{1}{4}$ which is the remaine of this ſubſtraction.

37	41
9 $\frac{1}{4}$	20 $\frac{1}{2}$

74 164

90

$\frac{37}{4}$ X $\frac{41}{2}$

8

164	22	
74	90	(11 $\frac{1}{4}$
90	88	

Subſtraction of broken numbers of *broken from fractions of fractions.*

5. If you will ſubſtract the $\frac{1}{2}$ of $\frac{2}{3}$ of $\frac{3}{5}$ from the $\frac{5}{8}$ of $\frac{3}{4}$ of $\frac{7}{8}$, you muſt firſt bring the $\frac{1}{2}$ of $\frac{2}{3}$ of $\frac{3}{5}$ into one fraction, by the 3 reduction: and the $\frac{5}{8}$ of $\frac{3}{4}$ of $\frac{7}{8}$, likewiſe into one fraction by the ſame reduction, and you ſhall finde $\frac{6}{30}$ for the firſt 3 broken numbers, which being abbrevied doe make $\frac{1}{5}$: and for the other 3 broken numbers, you ſhall finde $\frac{105}{256}$: which being likewiſe abbrevied doe make $\frac{35}{64}$, then you ſhall ſubſtract $\frac{1}{5}$ from $\frac{34}{64}$ by the Inſtruction of the firſt ſubſtraction in reducing both the

he fractions into a common denomination, as before is done, and you shall find remaining $\frac{111}{320}$ as may appeare by example.

	6				105	
$\frac{1}{2}$	$\frac{2}{3}$	$\frac{3}{5}$		$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$
	30		$\frac{1}{5}$		192 $\frac{35}{64}$	

64 175

$$\overset{111}{\underset{320}{\frac{1}{5} \times \frac{35}{64}}}$$

$$\begin{array}{r} 175 \\ 64 \\ \hline 111 \end{array}$$

¶ The sixt Chapter is of Multiplication *in broken numbers.*

FIrst for to multiply in broken number, there is a rule, which is thus, you must multiply the numerator, of the one fraction, by the numerator of the other. And likewise you must multiply the denominator of the one by the denominator of the other. And then divide the fraction if it may be divided, or else abbreviate it, if it may be abbrevied, and it is done. But if there be whole number and broken together, you must reduce the whole numbers into their broken, and adde thereunto the numerator of his broken, and then multiply as it is be-

foresaid, as also hereafter by examples shall more plainely appeare.

1. If you will multiply $\frac{2}{3}$ by $\frac{3}{4}$, you must multiply the numerator 2 by the numerator 3, and thereof commeth 6 for the numerator. Likewise you must multiply the denominators the one by the other, that is to say, 3 by 4, and thereof commeth 12 for the denominator: so that this multiplication commeth to $\frac{6}{12}$ which being abbreviated doe make $\frac{1}{2}$: and so much amounteth the multiplication of the $\frac{2}{3}$ by $\frac{3}{4}$ as by practise appeareth.

$$\begin{array}{ccc} & 6 & \\ \hline \frac{2}{3} & & \frac{3}{4} \\ \hline & 12 & \end{array} \qquad \begin{array}{c} 1 \\ \frac{6}{12} \\ 2 \end{array}$$

2. Likewise if you will multiply a broken number by whole number, or whole number by broken, which is all one, as $\frac{4}{5}$ by 18, or else 18 by $\frac{4}{5}$, you must set 1 under 18, thus $\frac{18}{1}$: and then multiply the numerator 18, by the numerator 4, and thereof commeth 72. Likewise multiply the denominator 5, by the denominator 1, and thereof commeth 5, then divide 72 by the denominator 5, and thereof commeth 14 $\frac{2}{5}$: for the whole multiplication. Or otherwise, abate from 18 his $\frac{1}{5}$ part, which is 3 $\frac{3}{5}$ and there

there remaineth 14 $\frac{2}{5}$, as hereafter followeth.

$$\begin{array}{ccc} & 72 & \\ \hline \frac{4}{5} & & \frac{18}{5} \\ \hline & 5 & \end{array} \qquad \begin{array}{l} 2 \\ 72 \;(14\frac{2}{5} \\ 55 \end{array}$$

Otherwise.

$$\begin{array}{ccc} & 18 & \\ \hline \frac{18}{1} & & \frac{1}{5} \\ \hline & 5 & \end{array} \qquad \begin{array}{l} 3 \\ 18 \;(3\frac{1}{5} \\ 5 \end{array} \qquad \begin{array}{r} 18 \\ 3\ \frac{1}{5} \\ \hline 14\ \frac{2}{5} \end{array}$$

3. Also if you will multiply a whole number, by whole number and broken, or else whole number and broken by a whole number, which is all one, as by example: if you will multiply 15 by 16 $\frac{3}{4}$, or else 16 $\frac{3}{4}$ by 15: First reduce 16 $\frac{3}{4}$ all into fourths, in multiplying 16 by the denominator of $\frac{3}{4}$ which is 4, and thereof commeth 64, whereunto adde the Numerator 3, and it maketh $\frac{67}{4}$: which multiply by $\frac{15}{1}$ according to the instruction of the last example, and you shall finde the product of this multiplication to be 251 $\frac{1}{4}$, as by practise in the next page following doth appeare.

67	1005	67	2 1
$16\frac{3}{4}$	$\frac{67}{4}$ $\frac{15}{1}$	15	1005 ($251\frac{1}{4}$
	4	335	444
		67	
		1005	

4. And if you will multiply a broken number, by whole number and broken, or else whole number and broken by a broken. As by Example, if you will multiply $\frac{1}{4}$ by 18 $\frac{2}{3}$, or else 18 $\frac{2}{3}$ by $\frac{1}{4}$, which is all one: you must reduce the whole number into his broken by the first reduction. And you shall find $\frac{56}{3}$, which you shall multiply by the $\frac{1}{4}$ after the doctrine of the first multiplication, that is to say: in multiplying the Numerator 56, by the Numerator $\frac{1}{4}$, which is 1: and it is still 56, because 1 doth neither multiply nor divide. And likewise you must multiply the denominator 3, by the denominator 4, and it maketh 12: then divide 56 by 12, and thereof commeth 4 $\frac{2}{3}$. And so much amounteth the multiplication of the said 18 $\frac{2}{3}$ multiplied by $\frac{1}{4}$ as by example.

56	56	18	
18 $\frac{2}{3}$	$\frac{56}{3}$ $\frac{1}{4}$	56	($4\frac{2}{3}$
	12	12	

5. If you will multiply whole number and broken, with whole and broken, you must first put either whole number into his broken, according to the instruction of the sixt reduction, and then multiply the one numerator by the other, and of the product make your numerator. And likewise multiply the denominators the one by the other, and thereof make the denominator, then divide the numerator by the denominator, and the quotient shall be the encrease of this multiplication. Example. If you would multiply 12 $\frac{4}{5}$ by 6 $\frac{3}{4}$: first by the sixt reduction the 12 $\frac{4}{5}$ will make $\frac{64}{5}$: and the 6 $\frac{3}{4}$ will make $\frac{27}{4}$, then multiply the numerator 64, by the numerator 27, and thereof commeth 1728 for the numerator. And then you must multiply the denominator 5, by the denominator 4, and they doe make 20: then divide 1728, by 20, and thereof commeth 86 $\frac{2}{5}$, for the whole multiplication, as by example.

1728		64	1
64 27		27	1728
12 $\frac{4}{5}$ 6 $\frac{3}{4}$		448	200 (86 $\frac{2}{5}$
		128	2
20		1728	

6. If you will multiply one broken number by many broken numbers, thus: As to multiply

multiply $\frac{2}{3}$ by $\frac{5}{7}$ and by $\frac{4}{9}$, you must multiply the numerators of all the fractions, the one by the other, and of the product make the numerator, that is to say, 2 by 5, and they be 10, then 10 by 4, and they be 40 for the Numerator. Likewise you must multiply the denominators the one by the other, that is to say 3 by 7 maketh 21, then 21 by 9 maketh 189, for the denominator: then set 40 over the 189 with a line between them, and they make $\frac{40}{189}$. And so much amounteth the whole multiplication of the $\frac{2}{3}$ multiplied by $\frac{5}{7}$ and $\frac{4}{9}$ as by example following. And thus is to be understood of all such like.

	2	3
	5	7
40	10	21
$\frac{2}{3}$ — $\frac{5}{7}$ — $\frac{4}{9}$	4	9 $\frac{40}{189}$
189	40	189

The 7 Chapter treateth of Division in *broken Numbers*.

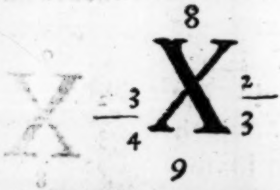
Note that in Division of broken numbers, you must set your divisor down first, next unto the left hand, and the dividend or number which is to be divided alwayes toward the right hand. And then multiply crossewise, that is

to say, the numerator of your diuisor, by the denominator of the diuidend: & the product shall be the denominator, which afterwards shall be your diuisor. And likewise you must multiply the Denominator of your first number, that is to say, of your first diuisor, by the Numerator of the Diuidend, which afterwards shall be the Diuidend, and that must be set ouer the Crosse, and the denominator under the crosse, then diuide the numerator by the denominator if it may be diuided, if not, you must abbreuiate them, as hereafter by examples shall more plainely appeare.

1. If you will diuide $\frac{3}{4}$ by $\frac{2}{3}$, you must set the diuisor (which is $\frac{2}{3}$) next to the left hand, and the Diuidend $\frac{3}{4}$ toward your right hand, with a crosse betweene them: as may appeare by this example in the margent. Then you shall multiply the numerator of the $\frac{2}{3}$, which is 2 by the denominator of the $\frac{3}{4}$ which is 4, and thereof commeth 8 which shall be be your new deuisor: set that 8 under the Crosse, as the Denominator: then multiply the numerator of the diuidend, that is to say, of the $\frac{3}{4}$ which is 3 by the denominator of the

diuisor,

divisor, that is to wit, of the $\frac{2}{3}$ which is 3 and thereof commeth 9, set the 9 over the crosse of the numerator: which shall be now the dividend or number to be divided. Then finally you shall divide 9, by 8 : and therof commeth into the quotient 1 $\frac{1}{8}$, and so often-times is $\frac{2}{3}$ contained in $\frac{3}{4}$, as doth appeare before in the margent. But in case you would divide $\frac{2}{3}$ by $\frac{3}{4}$, you must likewise set your divisor $\frac{3}{4}$ next to your left hand, as is before said. And then proceed as is above declared, and you shall finde that $\frac{2}{3}$ divided by $\frac{3}{4}$ bringeth into the quotient $\frac{8}{9}$, which cannot be divided nor abbrevied. Wherefore it appeareth that $\frac{2}{3}$ being divided by $\frac{3}{4}$, bringeth but $\frac{8}{9}$ of one unite into the quotient, as doth appeare.



2. Likewise if you will divide a broken number by a whole number, or else a whole number by a broken, as to divide $\frac{3}{4}$ by 13, you

shall

ſhall put 1 under 13, and twill be $\frac{13}{1}$ for your diviſor, ſet that toward your left hand, and then multiply 13 by 4 according to the firſt diviſion, and thereof will come 52, for the denominator, ſet that under the croſſe: and multiply 3 by 1, maketh 3, for the numerator: ſet that over the croſſe, and it is $\frac{3}{52}$, as appeareth above.

$$\begin{array}{ccc} & 3 & \\ \frac{13}{1} & \times & \frac{3}{4} \\ & 52 & \end{array}$$

But if you will divide 13 by $\frac{3}{4}$, then ſet the $\frac{3}{4}$ next your left hand, and put one under 13, as in the laſt example, and it is $\frac{13}{1}$, ſet that toward your right hand thus, as appeareth in the margent, and then worke according to the doctrine of the firſt Diviſion, and you ſhall finde that 13 being divided by $\frac{3}{4}$ bringeth into the quotient $\frac{52}{3}$ then divide 52 by 3, and thereof commeth 17 $\frac{1}{3}$, and ſo oftentimes is $\frac{3}{4}$ contained in 13, as doth appeare.

$$\begin{array}{ccc} & 52 & \\ \frac{3}{4} & \times & \frac{13}{1} \\ & 3 & \end{array}$$

$$\begin{array}{ll} \cancel{2}1 & \\ \cancel{5}\cancel{2} & \\ \cancel{3}\cancel{3} & (17\frac{1}{3} \end{array}$$

3. And if you will divide whole number by whole number and broken, or elſe whole number and broken by whole number, as to divide 20 by 5 $\frac{5}{7}$ you ſhall reduce 5 $\frac{5}{7}$ into

broken,

broken, by the firſt reduction, and it maketh $\frac{35}{6}$ for your diuiſor, then put 1 under 20, and it will bee $\frac{20}{1}$, then ſhall you multiply 35, by 1, and 20 by 6, as is taught in the other diuiſions, and you ſhall find $\frac{120}{35}$: then diuide 120 by 35, and you ſhall find in your quotient 3, and $\frac{15}{35}$, the which $\frac{15}{35}$ being abbreuied, is $\frac{3}{7}$, and ſo many times is $5\frac{5}{6}$ contained in 20, as in the margent appeareth.

120

$\frac{35}{6}$ X $\frac{20}{1}$

35

1
~~35~~
~~120~~ (3 $\frac{3}{7}$
~~35~~

But if you will diuide $5\frac{5}{6}$ by 20, you ſhall haue $\frac{35}{120}$, then you muſt diuide 35 by 120, which you cannot diuide, wherefore you ſhall abbreuiate $\frac{35}{120}$, and thereof commeth $\frac{7}{24}$ for your quotient.

4 If you will diuide a broken number, by whole number & broken, or elſe whole number and broken by a broken number. As to diuide $\frac{3}{4}$ by $13\frac{2}{3}$ you muſt reduce $13\frac{2}{3}$ into his broken, by the firſt reduction, and they be $\frac{41}{3}$ for your diuiſor, then multiply 41 by 4, & they make 164 for your denominator, likewiſe multiply 3 by 3, and they make

41
$13\frac{2}{3}$

9

$\frac{41}{3}$ X $\frac{3}{4}$

164

make 9 for the numerator, and then will your summe be $\frac{9}{164}$, as appeareth in the worke afore noted. But if you will divide $13\frac{2}{3}$ by $\frac{3}{4}$, then you must divide 164 by 9, and you shall find $18\frac{2}{9}$.

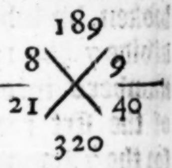
5. If you will divide whole number and broken, by whole number, and broken, as to divide $7\frac{3}{4}$ by $13\frac{2}{3}$, you must reduce the whole numbers into their broken, by the doctrine of the first reduction, and you shall find $\frac{31}{4}$, for the $7\frac{3}{4}$, and $\frac{41}{3}$ for the $13\frac{2}{3}$: Then set downe $\frac{41}{3}$ toward the left hand, because it is your divisor, and the $\frac{31}{4}$ towards the right hand, and multiply 41 by 4, for your denominator: and thereof commeth 164. Likewise multiply 31 by 3, for your Numerator, and it amounteth to 93: the which will be thus $\frac{93}{164}$ as before doth appeare.

$$\begin{array}{ccc} & 93 & \\ \frac{41}{3} & \times & \frac{31}{4} \\ & 164 & \end{array}$$

But if you will divide $13\frac{2}{3}$ by $7\frac{3}{4}$ you must (contrariwise to the other example) divide 164, by 93: and you shall find in the quotient $1\frac{71}{93}$.

6. The broken numbers of broken, must be divided in such manner as broken numbers are, and there is no difference, saving onely that of divers and many broken numbers, you must make but two broken numbers,

bers, that is to say, the one for the divisor, and the other for the dividend, or number that is to be divided : example. If you will divide the $\frac{3}{4}$ of $\frac{3}{5}$ of $\frac{1}{2}$, by the $\frac{2}{3}$ of $\frac{4}{7}$, you must understand, that for the first, the $\frac{3}{4}$ of $\frac{3}{5}$ of $\frac{1}{2}$, are $\frac{9}{40}$ by the 3 Reduction : and the $\frac{2}{3}$ of $\frac{4}{7}$, are by the same reduction $\frac{8}{21}$, then have you $\frac{8}{21}$ for your divisor, and $\frac{9}{40}$ for your number to be divided, then multiply 8 by 40, which maketh 320, set that under the crosse, and multiply 9 by 21, and thereof commeth 189: which set over the crosse for the numerator, and they make $\frac{189}{320}$ for his division, as doth appeare.



But if you would divide $\frac{8}{21}$ by $\frac{9}{40}$, you must worke contrary to the last example, that is to say, you must divide 320, by 189 : and thereof commeth in the quotient $1\frac{131}{189}$.

Chap.

Chap. 8.

Treateth of Duplation, Triplation, Quadruplation of all broken numbers.

If you will double any broken number, you shall divide the same by $\frac{1}{2}$: likewise if you will triple any fraction, you must divide it by $\frac{1}{3}$. And for to quadruple any broken number you shall divide it by $\frac{1}{4}$ and so is to be understood of all other.

Example of Duplation.

If you will double $\frac{3}{8}$ you shall divide $\frac{3}{8}$ by $\frac{1}{2}$, and thereof cometh $\frac{6}{8}$, which being abbreviated, are $\frac{3}{4}$: as by example.

Or otherwise, in case the denominator of any fraction be an even number, you may take halfe the said denominator, without any other operation, and the numerator to abide still the numerator, unto the said halfe of the denominator of the Fraction, as by the other example before rehearsed, that is to say, of $\frac{3}{8}$ take $\frac{1}{2}$, of 8, which is 4: and that is

the denominator, and 3 remaineth still numerator to 4 and it maketh $\frac{3}{4}$ and so of all other. But in case the denominator be an odde number, that is to say, not even, then you may multiply the numerator by 2, or else double the numerator, which is all one, and that fraction shall be doubled. Example, if you will double $\frac{3}{5}$, you must only multiply the numerator 3, by 2, and they be 6: which maketh that fraction to be $\frac{6}{5}$, the which 6 being divided by 5, bringeth $1\frac{1}{5}$ and so much is the double of $\frac{3}{5}$.

Example of Triplation.

If you will triple $\frac{3}{5}$, you must divide $\frac{3}{5}$ by $\frac{1}{3}$, and thereof cometh $\frac{9}{5}$ which being divided bringeth $1\frac{4}{5}$, or otherwise, because the denominator is an odde number, you may multiply the numerator 3 by 3, and there cometh 9 which maketh $\frac{9}{5}$ as before appeared.

Example of Quadruplation.

If you will quadruple $\frac{4}{5}$ you shall divide $\frac{4}{5}$ by $\frac{1}{4}$, and thereof cometh $\frac{16}{5}$, which 16 being divided by 5 bringeth $3\frac{1}{5}$, or otherwise, because the denominator of the fraction is an odde number, you shall multiply the numerator of the $\frac{4}{5}$, that is to say, 4 by 4, and thereof cometh 16: the which divide by 5,

and

and you shall find 3 $\frac{1}{5}$, as before. And this sufficeth for Duplation, Triplation, and Quadruplation.

Chap. 9.

Of the proofes of broken Numbers, And first of Reduction.

If you doe abbreviate the broken numbers which be reduced, you shall return them into their first estate: as by example, if you reduce $\frac{2}{5}$ with $\frac{4}{5}$, you shall find $\frac{10}{25}$ and $\frac{12}{15}$, then abbreviate $\frac{10}{15}$, and you shall find $\frac{2}{3}$, abbreviate likewise $\frac{12}{15}$, and thereof cometh $\frac{4}{5}$ as before.

The proofe of Abbreviation.

If you doe multiply that number which you have abbrevied, by that or those numbers, by the which you have abbrevied them, you shall return them again into their first estate. Example, if you will abbreviate $\frac{32}{48}$ by 16, in taking the $\frac{1}{16}$ part both of the numerator and also of the denominator, you shall find $\frac{2}{3}$, the proofe is thus, you must multiply both the numerator and denominator of $\frac{2}{3}$, that is to say, 3 by 16 maketh 48 for the denominator, and 2 by 16, maketh

32 for the numerator: then set the numerator 32, over the denominator 48, and they be $\frac{32}{48}$ as before.

If you doe substract one of the numbers, or many of them (which you have added) from the totall summe, there shall remaine the other, or others Example, if you doe adde $\frac{1}{3}$ with $\frac{1}{4}$, you shall find $\frac{7}{12}$. The proofe is, if you substract $\frac{1}{3}$ from $\frac{7}{12}$, you shall find remaining the other number, which is $\frac{1}{4}$, or else if you do substract $\frac{1}{4}$ from $\frac{7}{12}$ there will remain the other number which is $\frac{1}{3}$.

The proofe of Substraction.

If you doe adde that number which remaineth, with the number which you did substract, you shall find the totall sum, out of the which you made the abatement: or otherwise, if you adde the two lesser numbers together, you shall find the greater. Example: if you substract $\frac{1}{4}$ from $\frac{2}{3}$, there wil remain $\frac{5}{12}$. The proof is thus, you must add $\frac{5}{12}$ and $\frac{1}{4}$ together and you shall find $\frac{16}{48}$, the which being abbrevied doth make $\frac{2}{3}$ which is the graatest number.

The proof of Multiplication.

If you divide the product of the whole multiplication, by the multiplicator, you shall

shall find in your quotient, the multiplicand or number the which you have multiplied: or else if you divide the totall summe which is come of the multiplication, by the multiplicand: you shall find in the quotient the multiplicator. Example. If you multiply $\frac{2}{3}$ by $\frac{4}{5}$, the product of this multiplication will be $\frac{8}{15}$. The proofe is thus: you shall divide $\frac{8}{15}$ by the multiplicator $\frac{4}{5}$, and thereof cometh $\frac{2}{3}$, which is the multiplicand, or else divide $\frac{8}{15}$ by $\frac{2}{3}$, and you shall find the $\frac{4}{5}$, which is the multiplicator.

The proofe of Division.

If you doe multiply the quotient by the divisor, you shall find the number which you did divide, that is to say, your dividend. Example, if you divide $\frac{2}{3}$ by $\frac{3}{4}$ your quotient will be $\frac{8}{9}$, the proof is thus, you must multiply $\frac{8}{9}$ by $\frac{3}{4}$, and thereof cometh $\frac{24}{36}$, which being abbrevied are $\frac{2}{3}$, which is your dividend, and by this manner all whole numbers have their proofes as well as broken nnmbers.

Chap. 10.

Of certain questions done by broken numbers. And first by Reduction.

Find two numbers, whereof the $\frac{2}{7}$ of the one number, may be equall unto the $\frac{3}{8}$ of the other. Answ. You shall reduce $\frac{2}{7}$ and $\frac{3}{8}$ crosse-wise, and you shall find 16 over the $\frac{2}{7}$, & 21, over the $\frac{3}{8}$, which are the two numbers that you seek: for the $\frac{3}{8}$ of 16 are 6: and so are the $\frac{2}{7}$ of 21, likewise 6: wherefore you may perceive that the $\frac{3}{8}$ of 16 which are 6, are equall unto the $\frac{2}{7}$ of 21, which is also 6.

2. Find two numbers, whereof the $\frac{2}{3}$ of the one, may be double to the $\frac{1}{4}$ of the other. Answer. Double $\frac{1}{4}$, and you shall have $\frac{2}{4}$, which being abbreviated is $\frac{1}{2}$: then reduce $\frac{2}{3}$ and $\frac{1}{2}$ crossewise, and you shall find 4 over the $\frac{2}{3}$, and 3 over the $\frac{1}{2}$, which are the two numbers that you seek. For the $\frac{2}{3}$ of 3, which is 2 is double unto the $\frac{1}{4}$ of 4, which is but 1.

3. Find two numbers whereof the $\frac{2}{3}$ and the $\frac{1}{4}$ of the one, may be equall unto the $\frac{1}{4}$ and $\frac{1}{5}$ of the other. Answer. Adde the $\frac{2}{3}$ and $\frac{1}{4}$ together, and they make $\frac{7}{12}$, then adde $\frac{1}{4}$ and $\frac{1}{5}$ together, and they are $\frac{9}{20}$: then reduce $\frac{7}{12}$ and $\frac{9}{20}$ crosse-wise, and you shall have 140 over

over the $\frac{7}{12}$, and 108 over the $\frac{9}{20}$, which are the two numbers that you seek. For 63 which are the $\frac{7}{12}$ of 108, are also the $\frac{9}{20}$ of 140.

4. Find two numbers, whereof the $\frac{1}{2}$ the $\frac{1}{3}$ & the $\frac{1}{4}$ of the one of them, may be equall unto the $\frac{1}{5}$ and $\frac{1}{6}$ and $\frac{1}{7}$, of the other number. Ans. First you must adde $\frac{1}{2}$, $\frac{1}{3}$, and $\frac{1}{4}$ together, and they make $\frac{13}{12}$: then adde $\frac{1}{5}$, $\frac{1}{6}$, and $\frac{1}{7}$ together, and they make $\frac{107}{210}$. Then reduce $\frac{13}{12}$ and $\frac{107}{210}$ crosse-wise, as by the first question of reduction, and you shall find 2730 over the $\frac{13}{12}$, and 1284 over the $\frac{107}{210}$, which are the two numbers that you seek: for 1391 which is the $\frac{1}{2}$ the $\frac{1}{3}$ the $\frac{1}{4}$ of 1284: is like to the $\frac{1}{5}$, $\frac{1}{6}$, and $\frac{1}{7}$ of 2730, which is also 1391.

5. Find three numbers, whereof the $\frac{2}{5}$ of the first, the the $\frac{3}{7}$ of the second, and the $\frac{4}{9}$ of the third, may be equall the one to the other. Answer. Set down the $\frac{2}{5}$, $\frac{3}{7}$, and $\frac{4}{9}$, and then multiply the denominator of the $\frac{2}{5}$, that is to say 5 by the Numerators of the other two Fractions, that is to say, by the numerator of $\frac{3}{7}$, and by the numerator of $\frac{4}{9}$, which is 3 and 4, and thereof cometh 60 for you first number: then shall you multiply the Denominator of the $\frac{3}{7}$, which is 7, by the numerators of $\frac{2}{5}$ and $\frac{4}{9}$, that is to say, by 2 and 4, and thereof cometh 56, for the

second number. Then multiply the denominator of $\frac{4}{9}$, that is to say, 9 by the numerator of $\frac{2}{5}$ and $\frac{3}{7}$, that is by 2 and 3, and thereof cometh 54, for the third number. And thus the $\frac{2}{5}$ of 60, which is 24, is likewise the $\frac{3}{7}$ of of 56, which is the second number, and is also the $\frac{4}{9}$ of 54 which is the third number.

6. Find three numbers, of which the first and the second may be in such proportion as $\frac{1}{2}$ and $\frac{1}{3}$, and the second and third in such proportion as $\frac{1}{4}$ and $\frac{1}{5}$. Answer. Reduce $\frac{1}{2}$ and $\frac{1}{3}$ crosse-wise, and you shall have 3 over the $\frac{1}{2}$, and 2 over the $\frac{1}{3}$, then reduce $\frac{1}{4}$ and $\frac{1}{5}$ in like manner, and you shall find 5 over the $\frac{1}{4}$, and 4 over the $\frac{1}{5}$. Then say by the Rule of three, if 5 do give me 4, what shall 2 give me, which is the second proportionall, multiply the second number 4, by the third number 2, and thereof cometh 8, the which divide by the first number 5, and thereof cometh $1\frac{3}{5}$ for the third proportionall: and you shall find that 3, 2, $1\frac{3}{5}$, are the three numbers proportionall that I demand, or else 14, 10, & 8, in whole numbers.

Questions done by Addition in *Fractions*.

WHat number is that, unto the which if you adde 13 the whole amounteth to 31? Answer. Substract 13 from

from 31, and there will remain 18, which is the number you seek.

2. What number is that, unto the which if you add $\frac{2}{5}$, the addition will be $\frac{5}{8}$? Answer. Abate $\frac{2}{5}$ from $\frac{5}{8}$, and there will remain $\frac{13}{30}$, which is the number that you desire

3. What number is that, whereunto if you adde $7\frac{2}{3}$, the whole addition will bee $12\frac{1}{4}$? Answer. Abate $7\frac{2}{3}$ from $12\frac{1}{4}$, and the remain will be $4\frac{7}{12}$, which is the number that you desire to know.

4. What number is that whereunto if you adde the $\frac{3}{4}$ of it selfe, that is to say, of the number that you seek, the whole addition may be $\frac{5}{8}$? Answer. Here followeth a generall rule for all such like questions. First of 3, which is the numerator of $\frac{3}{4}$ make that still the numerator: and likewise of 3 and 4 added together, which is both the numerator, and the denominator, of the $\frac{7}{4}$, make them your denominator: so you shall find $\frac{3}{7}$: then take the $\frac{3}{7}$ of $\frac{5}{8}$ which is $\frac{15}{42}$ or $\frac{5}{14}$, and substract them from $\frac{5}{8}$, and there will remain $\frac{10}{21}$, which is the number that you seek.

5. What number is that, unto the which if you adde his own $\frac{2}{3}$ that is to say $\frac{2}{3}$ of it selfe, the whole addition shall be 20? Ans. Doe as in the last question, of the nume-

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rator of $\frac{2}{3}$, that is to say of 2, make still your numerator: and likewise of the numerator 2 and the denominator 3 of the $\frac{2}{3}$ make of them both, your denominator: and you shall find $\frac{2}{5}$, then take the $\frac{2}{5}$ of 20 which are 8, and abate them from 20, and there will remain 12: which is the number that you desire. And so it is to be done of all such like reasons.

Questions done by Substraction in *Fractions*.

VVHat number is that, from the which if you do abate 17, the rest may be 19? Ans. Adde 17 and 19 together, and you shall find 37, which is the number that you seek.

2. What number is that, from the which if you abate $\frac{3}{5}$, the rest may be $\frac{1}{8}$? Ans. Adde $\frac{3}{5}$ and $\frac{1}{8}$ together, and you shall find $\frac{29}{40}$, which is the number that you demand.

3. What number is that, from the which if you reduct 13 $\frac{1}{2}$, the rest may be 5 $\frac{5}{7}$? Ans. Add 13 $\frac{1}{2}$ and 5 $\frac{5}{7}$ together, and thereof cometh 19 $\frac{3}{14}$, which is the number that you seek.

4. What number is that, from the which if you substract his $\frac{2}{5}$, that is to say $\frac{2}{5}$ of it selfe, the rest may be 12? Answer. And a rule for such like reasons: that is to say, from the denominator of $\frac{2}{5}$ which is 5 abate 2 which

2 which is his numerator, and there resteth 5 for the denominator, & thus of $\frac{2}{5}$ you have now made $\frac{2}{3}$, then take the $\frac{2}{3}$ of 12 which are 8, and adde them unto 12, and thereof cometh 20, for the number which you desire.

5. What number is that, from the which if you do abate his $\frac{3}{4}$, the rest may be $\frac{8}{9}$? Ans. From the denominator of $\frac{3}{4}$, which is 4, substract his numerator 3 and there resteth 1, thus of $\frac{3}{4}$ you have made $\frac{3}{1}$. Then multiply $\frac{3}{1}$ by $\frac{8}{9}$, and thereof cometh $2\frac{2}{3}$, the which adde unto $\frac{8}{9}$, and you shall have $3\frac{5}{9}$, which is the number that you seek.

6. What number is that from the which if you abate his $\frac{4}{5}$, the rest may be $12\frac{2}{3}$? Ans. Doe as you did in the last question, and you shall find that the $\frac{4}{5}$ will be $\frac{4}{1}$: And therefore multiply $12\frac{2}{3}$ by $\frac{4}{1}$, and thereof cometh $50\frac{2}{3}$, the which adde unto $12\frac{2}{3}$, and you shall find $63\frac{1}{3}$, for the number that you demand. And thus of all such like Questions.

Questions of Multiplication in Fractions.

WHat number is that, which being multiplyed by 13, the whole product of that multiplication shall make 221? Answer. Divide 221 by 13, and thereof

cometh

cometh 17, which is the number that you seek.

2. What number is that which being multiplyed by 15, the whole multiplication will amount to $\frac{3}{4}$? Answer. Divide $\frac{3}{4}$ by $\frac{15}{1}$, and thereof cometh $\frac{1}{20}$, which is the number that you seek.

3. What number is that, which being multiplyed by 21, the whole multiplication will be $16\frac{4}{5}$? Answer. Divide $16\frac{4}{5}$ by $\frac{21}{1}$, and you shall find $\frac{4}{5}$, and that is the number that you demand.

4. What number is that, which being multiplied by $\frac{3}{4}$, the multiplication will amount to 18? Answer. Divide $\frac{18}{1}$ by $\frac{3}{4}$, and thereof cometh 24 which is the number that you desire to know.

5. What number is that which if it be multiplyed by $\frac{2}{3}$, the whole multiplication will be $\frac{1}{4}$? Answer. Divide $\frac{1}{4}$ by $\frac{2}{3}$, and the quotient will be $\frac{3}{8}$ which is the number that you require to know.

6. What number is that, whichbeing multiplied by $\frac{5}{8}$, the product of the multiplication will be $16\frac{2}{3}$? Answer. Divide $16\frac{2}{3}$ by $\frac{5}{8}$, and thereof cometh $26\frac{2}{3}$, which is the number that you seek.

Here

Here ensueth other necessary questions, which are wrought by Multiplication in broken numbers.

I Demaund how much the $\frac{5}{8}$ of 20 shil. are worth, or what are the $\frac{5}{8}$ of 20 shillings? Answ. You must multiply $\frac{5}{8}$ by $\frac{20}{1}$, and the product will be $\frac{100}{8}$, therefore divide 100 by 8, and thereof commeth 12 $\frac{4}{8}$, which is to say, 12 s. 6 d. and so much are the $\frac{5}{8}$ of 20 shillings worth.

2 I demaund what the $\frac{3}{4}$ of $\frac{5}{6}$ of a pound of money are worth? That is to say of 20 s. Answ. Multiply $\frac{3}{4}$ by $\frac{5}{6}$, and thereof commeth $\frac{5}{8}$: Then take the $\frac{5}{8}$ of 20 shillings, as in the last Question going before, and you shall find 12 s. 6 pence, and so much are $\frac{3}{4}$ of $\frac{5}{6}$ of 20 s. worth.

3 I demaund what the $\frac{2}{3}$ of 8 d. $\frac{1}{2}$ are worth? Answ. Multiply 8 $\frac{1}{2}$ by $\frac{2}{3}$ or else $\frac{2}{3}$ by 8 $\frac{1}{2}$, which is all one, and you shall find $\frac{34}{6}$. Then divide 34 by 6, and your Quotient will be 5 pence $\frac{2}{3}$, and so much are the $\frac{2}{3}$ of 8 d. $\frac{1}{2}$ worth.

4 What are the $\frac{3}{4}$ of 14 pence $\frac{3}{5}$? Answ. Multiply 14 $\frac{3}{5}$ by $\frac{3}{4}$, and thereof commeth $\frac{219}{20}$: Therefore divide 219 by 20, and your Quotient will be 10 pence $\frac{19}{20}$: and so much are the $\frac{3}{4}$ of 14 $\frac{3}{5}$.

5 How

5 How many quarters or fourth parts are contained in $7\frac{2}{3}$? Answ. Multiply $7\frac{2}{3}$ by $\frac{4}{1}$ (because one whole containeth 4 quarters) and thereof commeth $30\frac{2}{3}$, and so many quarters are in the $7\frac{2}{3}$, that is to say, 30 quarters and $\frac{2}{3}$ of a quarter.

6 How many thirds are in $\frac{3}{4}$ and $\frac{1}{2}$, that is to say, in 3 quarters, and $\frac{1}{2}$ of one quarter or $\frac{1}{8}$? which are $\frac{7}{8}$ by the fift reduction. Answ. Multiply $\frac{7}{8}$ by $\frac{3}{1}$ (for because that in 1 whole are contained 3 thirds) and thereof commeth $2\frac{5}{8}$, the which $2\frac{5}{8}$ doe signifie $\frac{2}{3}$, and $\frac{5}{8}$ of a third: and so many thirds are in $\frac{3}{4}$ and $\frac{1}{2}$ or in $\frac{7}{8}$, which is all one.

Questions done by Division in *broken numbers.*

1. What number is that, which being divided by 17 the quotient will be 13? Answ. Multiply 17 by 13, and thereof commeth 221, which is the number that you seeke.

2. What number is that, which being divided by $\frac{3}{4}$, the quotient will be 21? Answ. Multiply $\frac{21}{1}$ by $\frac{3}{4}$, and thereof commeth $\frac{63}{4}$: Then divide 63 by 4, and thereof commeth $15\frac{3}{4}$: which is the number that you seeke.

3. What number is that, which being divided by $\frac{1}{8}$, the quotient will be $\frac{2}{3}$? Answ. Multiply $\frac{2}{3}$

Multiply $\frac{2}{3}$ by $\frac{5}{8}$, and thereof commeth $\frac{10}{24}$: which being abbreviated are $\frac{1}{12}$, for the number which you require.

4. What number is that, which being divided by $\frac{4}{5}$, the quotient will be $16\frac{2}{3}$? Answ. Multiply $16\frac{2}{3}$ by $\frac{4}{5}$, and thereof commeth $\frac{200}{15}$. Therefore divide 200 by 15, and thereof commeth $13\frac{1}{3}$, which is the number that you desire to find.

5. What number is that, which being divided by $13\frac{1}{3}$, the quotient will be 20? Answ. Multiply $\frac{20}{1}$ by $13\frac{1}{3}$, and thereof commeth $\frac{800}{3}$, then divide 80 by 3 and thereof commeth $266\frac{2}{3}$: for the number which you seeke.

6. What number is that, which if it be divided by $12\frac{1}{2}$ the quotient will be $\frac{7}{8}$? Ans. Multiply $12\frac{1}{2}$ by $\frac{7}{8}$, and thereof commeth $\frac{175}{16}$: then divide 175 by 16, and thereof commeth $10\frac{15}{16}$: for the number which you desire.

Other necessary questions done by *Division in broken numbers.*

I Demaund what part 30 is of 70? Answ. divide 30 by 70, which you cannot, for they are $\frac{30}{70}$, but abbrevy them, and they are $\frac{3}{7}$: thus 30 are the $\frac{3}{7}$ of 70.

2. I demaund what part 10 is of $16\frac{2}{3}$? Answ. Divide $\frac{10}{1}$ by $16\frac{2}{3}$, and thereof commeth

meth $\frac{30}{50}$, which being abbreuied are $\frac{3}{5}$. And thus 10 is found to be $\frac{3}{5}$ of 16 $\frac{2}{3}$.

3. More, $\frac{5}{8}$ of one unit, what part are they of 25? Answ. Divide $\frac{5}{8}$ by $\frac{25}{1}$, and thereof commeth $\frac{5}{200}$, which being abbreuied is $\frac{1}{40}$, and thus $\frac{5}{8}$ of 1, is but the $\frac{1}{40}$ of 25.

4. More, $\frac{5}{6}$ what part are they of $\frac{7}{8}$? Answ. Divide $\frac{5}{6}$ by $\frac{7}{8}$, and you shall find $\frac{40}{42}$ which abbreuied are $\frac{20}{21}$.

5. More, $\frac{4}{5}$ of 1, what part are they of 13 $\frac{1}{3}$? Answ. Divide $\frac{4}{5}$ by 13 $\frac{1}{3}$, and you shall find $\frac{12}{200}$: which being abbreuied are $\frac{3}{50}$: And thus $\frac{4}{5}$ of 1, are the $\frac{3}{50}$ of 13 $\frac{1}{3}$.

6. More, 12 $\frac{1}{2}$ what part are they of 30? Answ. Divide 12 $\frac{1}{2}$ by $\frac{30}{1}$, and you shall finde $\frac{25}{60}$, which being abbreuied are $\frac{5}{12}$ and thus 12 $\frac{1}{2}$, are the $\frac{5}{12}$ of 30.

7 More, 16 $\frac{2}{3}$ what part are they of 57 $\frac{1}{7}$? Answ. Divide 16 $\frac{2}{3}$ by 57 $\frac{1}{7}$, and thereof commeth $\frac{350}{1200}$ which being abbreuied are $\frac{7}{24}$: and thus 16 $\frac{2}{3}$ are the $\frac{7}{24}$ of $\frac{1}{7}$.

8. More, $\frac{3}{4}$ and $\frac{2}{3}$ of $\frac{1}{4}$, or 3 quarters and $\frac{2}{3}$ of one quarter, what part are they of 1? Answ. reduce $\frac{3}{4}$ & the $\frac{2}{3}$ of $\frac{1}{4}$ into one broken number by the 5 reduction, and you shall finde $\frac{11}{12}$. And thus the $\frac{3}{4}$, $\frac{2}{3}$ of $\frac{1}{4}$, are the $\frac{11}{12}$ of 1 whole.

9 More, of what number are 9 the $\frac{2}{3}$? Answ. Divide 9 by $\frac{2}{3}$, and thereof commeth 13 $\frac{1}{2}$: which is the number whereof 9 are the $\frac{2}{3}$.

10 More

10 More, of what number are $\frac{2}{5}$ the $\frac{3}{4}$? Anſw. Divide $\frac{2}{5}$ by $\frac{3}{4}$, and thereof commeth $\frac{8}{15}$: which is the number whereof $\frac{2}{5}$ are the $\frac{3}{4}$ of the ſame number.

11 More, of what number are $5\frac{3}{4}$, the $\frac{3}{7}$? Anſw. Divide $5\frac{3}{4}$ by $\frac{3}{7}$, and you ſhall find $13\frac{5}{12}$, which is the number whereof $5\frac{3}{4}$ are the $\frac{3}{7}$.

12 More, $9\frac{2}{3}$, what part are they of $33\frac{1}{2}$? Anſw. Divide $9\frac{2}{3}$ be $33\frac{1}{2}$, and thereof commeth $\frac{58}{201}$: and thus $9\frac{2}{3}$ are the $\frac{58}{201}$ of $33\frac{1}{2}$ as appeareth.

The Third part treateth of certaine briefe Rules, called Rules of Practise, with divers necessary questions: profitable not onely for *Merchants*, but also for all other Occupiers.

Chap. 1.

SOme there be, which doe call these Rules of practise, briefe Rules: for that by them, many questions may be done with quicker expedition, than by the rule of Three. There be others which call them the small multiplication, for because that the product is always lesse in quantity, then the number which is to be multiplied. This practise commeth not in use, but onely among small kinds of numbers, which have over them other numbers that are greater. And this being well considered, is no other thing but to convert lesser, and particular kinds of number, into greater: the which may be done by the meanes of division, in taking the halfe, the third, the fourth, the fift, or such other parts of the summe, which is to be multiplied, as the multiplier is part of his greater kind, and that which commeth thereof, is worth as much

much (not in quantity, but in his owne forme and quality) as if you did multiply simply the two summs, the one by the other. And for the better understanding of such conversions, you must have respect to one of these two considerations: the first is, when one would demaund this question, At 6 d. the yard of Cotten, what are 18 yards worth by the price? It is manifest that they are worth 18 peeces of 6 pence the peece, or 18 halfe shillings, which must be turned into shillings, in taking the halfe of 18 s. and they make 9 s: Or otherwise you must consider that at 1 s. the yard, the 18 yards are worth 18 s. Therefore at 6 d. they shall be but halfe so much, for 6 d. is but the $\frac{1}{2}$ of 1 s. Thereof you must take the $\frac{1}{2}$ of 18 s. and they make 9 s. which are worth as much as 108 d. that is to say, as 18 times 6 pence.

6
18

Rule.

First, if you will multiply any number after this manner by pence, whereof the number of the same pence doe not extend unto 12, and thereof to bring shillings into the product: you must know the * aliquot parts of 12, which are these: that is to say, 6, 4, 3, 2, & 1. For 6 is the $\frac{1}{2}$ of 12, and 4 is the $\frac{1}{3}$ of 12, 3 is the $\frac{1}{4}$, 2 is the $\frac{1}{6}$, & 1 is the $\frac{1}{12}$. Then for 6 d. which is the halfe of 1 shilling,

** An aliquot part is an even part of a shilling or of a pound or of any other thing, as $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, $\frac{1}{5}$, &c. are called aliquot parts.*

ling, you must take the $\frac{1}{2}$ of all the number which is to be multiplied: And that which commeth thereof shall be shillings: if there doe remaine 1, it is 6 pence.

For four pence, you must take the $\frac{1}{3}$ of all the number that is to be multiplied: and if any unites doe remaine, they shall be thirds of a shilling every one being in value 4 d.

For 3 pence you must take the $\frac{1}{4}$ of al the summe: if any unites do remaine they shall be fourths of a shilling, every one being worth 3 pence.

For 2 pence you must take the $\frac{1}{6}$ of all the summe, and if any unites doe remaine, they shall be six parts of a shilling, being every one of them worth 2 pence.

For 1 d. take the $\frac{1}{12}$ of the whole summe, if any unites doe remaine, they are the twelfth parts of a shilling each of them being in value 1 d. as by these examples following doth plainely appeare.

Example I.

At 6 pence the yard,
What are 59 yards worth?

---

29 shil. 6. Pence.

II.

II.

At 4 Pence the yard,
What are 82 yards?

27 *2 ſhil. 4. Pence.*

III.

At 3 Pence the yard,
What 97 yards?

24 ſhil. 3. Pence.

IV.

At 2 Pence the yard,
What 346 yards?

57 ſhil. 8. Pence.

V.

At 1 Penie the yard,
What 343. yards?

28 ſhil. 7. Pence.

Here you may ſee in the firſt example, that 59 yardes, at 6 pence the yard, are worth 29 ſhillings 6 pence, in taking the $\frac{1}{2}$ of 59. And in the ſecond example, the 82 yards at 4 d. the yard, are worth 27 s. 4 d. in taking the $\frac{1}{3}$ of 82.

Likewiſe in the third example 97 yards, at 3 pence the yard bringeth 24 ſhillings 3 pence, in taking the $\frac{1}{4}$ of 97. Alſo in the

fourth example 346 yards, at 2 pence the yard, maketh 57 shillings 8 pence, in taking the $\frac{1}{6}$ of 346. And finally in the fift example, 343 yards, at 1 d. the yard, amount to 28 shillings 7 d. in taking the $\frac{1}{12}$ of 343. And so is to be done of all such like, when the number of the pence is any of the aliquot parts of 12.

But if the number of the pence be not an aliquot part of 12, you must reduce them into some aliquot parts of 12: and after the aforesaid manner, you shall make of them two or three products as need shall require, & adde them together into one sum, as 5 d. may be reduced into 4 d. and 1 d. or else into 3, and 2 d. For 4 d. and 1 d. doe make 5 d. and so doe 3 d. and 2 d. the like. Wherefore if you will work by 4, and by 1: you must for 4 d. take first the $\frac{1}{3}$, of the number that is to be multiplyed, and for 1 d. take the $\frac{1}{12}$ of whole sum or rather for 1 d. ye may take the $\frac{1}{4}$ of the product which did come of the 4 d. because that 1 d. is the $\frac{1}{4}$ of 4 pence. But if you will work by 3 d. and 2 pence, you shall take for 3 pence the $\frac{1}{4}$ of the number which is to be multiplyed: and likewise for 2 pence the $\frac{1}{6}$ of the same number, adding together both the products: The totall Sum of those two numbers shall be

be the solution to the question. And in like manner is to be done of all others.

As by these examples following may appeare.

Example I.

At 5 Pence the yard,
What will 49 yards amount unto?

16 *shil.* 4 *pence.*
4 *shil.* 1 *d.*

20 *shil.* 5 *d.*

II.

At 7 d. the lib.
What will 54 lib. cost?

18 *shil.* 0 *d.*
13 *shil.* 6 *d.*

31 *shil.* 6 *d.*

III.

At 8 Pence the peece,
What are 40 worth?

13 *shil.* 4 *d.*
13 *shil.* 4 *d.*

26 *shil.* 8 *d.*

Otherwayes.

At 8 d. the peece.
What are 40 peeces worth?

20 *shil.*
6 *shil.* 8 *d.*
26 *shil.* 8 *d.*

IV.

At 9 Pence the yard,
What are 73 yards?

36 *shil.* 6 *d.*
18 *shil.* 3 *d.*
54 *shil.* 9 *d.*

V.

At 10 d. the Ell,
What are 32 Ells?

16 *shil.* 0.
10 *shil.* 8 *d.*
26 *shil.* 8 *d.*

VI.

At 11 d. the lib.
What are 27 lib?

9 *shil.* 0.
9 *shil.* 0.
6 *shil.* 9.
24 *shil.* 9 *d.*

Here

Here in this firſt example, where it is demanded (at 5 pence the yard) what will 49 yards amount unto? Firſt for 4 pence. I take the $\frac{1}{3}$ of 49 s. and thereof cometh 16 s. 4 d. then for 1 d. I take the $\frac{1}{4}$ of the ſame product, that is to ſay, of 16 s. 4 d. and that bringeth 4 s 1 d. theſe 2 Sums added together doe make 20 s. 5 d. And ſo much are the 49 yards worth at 5. the yard.

For 7 d. take the $\frac{1}{3}$ and the $\frac{1}{4}$ of the whole ſum which is to be multiplyed, and adde them together, that is to ſay, for 4 d. you muſt take $\frac{1}{3}$: and for 3 d. the $\frac{1}{4}$: becauſe 4 d. is the $\frac{1}{3}$ of 12 d. and 3 d. is the $\frac{1}{4}$, as in the ſecond example before doth appeare, where the queſtion is thus, at 7 d. the li. what will 54 li. coſt? Firſt for 4 d. I take the $\frac{1}{3}$ of 54 and they make 18 s. Likewiſe for 3 d. I take $\frac{1}{4}$ of 54, and they are 13 s. 6 d. Then I adde 18 s. and 13 s. 6 d. together, ſo both amount to 31 s. 6 d. and ſo much are the 54 li. at 7 d. the li.

Otherwiſe for 7 d. you ſhall take firſt the $\frac{1}{2}$ of the whole ſum for 6 d. Then for 1 d. you muſt take the $\frac{1}{6}$ of the ſame product, and adde them together, ſo you ſhall have the like Sum as before.

For 8 pence, you muſt firſt take $\frac{1}{3}$ of the whole ſum for 4 pence: and another $\frac{1}{3}$ for

other

other 4 d. and adde them together, as in this example doth evidently appear. When the question is thus, at 8 d. the peece, what are 40 peeces worth? First for 4 d. I take the $\frac{1}{3}$ of 40 which is 13 s. 4 d? Again, I take another $\frac{1}{3}$ for the other 4 pence which is also 13 s. and 4 pence. These two sums being added together, do make 29 shillings 8 pence; and so much are the 40 peeces worth, at 8 d. the peece: as in the third example above said doth appeare.

Otherwise for 8 pence, you may take first the $\frac{1}{2}$ of the whole sum for 6 d. Then for 2 d. you shall take the $\frac{1}{3}$ of the product, which did came of the said $\frac{1}{2}$ and adde them together: so shall you have likewise the solution to the question. As in the same third example of 40 yards: I take first the $\frac{1}{2}$ of 40 for 6 d. and thereof cometh 20 s. then for 2 d. I take $\frac{1}{3}$ of the said product, that is to say of 20 s. which bringeth 6 s. 8 d. these two sums (20 s. and 6 s. 8 d.) I adde together, and they make 26 s. 8 d. as before.

For 9 d. you must take the $\frac{1}{2}$, and the $\frac{1}{4}$ of the whole sum, and adde them together: or else for 6 d. take first $\frac{1}{2}$ of the whole sum, then for 3 d. take the $\frac{1}{2}$ of the same product, because 3 d. is the halfe of 6 d. And 6 d. added with 3 d. bringeth 9 d. as by the fourth

fourth example where it is demanded after this sort, at 9 d. the yard, what are 73 yards worth? First for 6 d. I take the $\frac{1}{2}$ of 73? and thereof cometh 36 s. 6 d. then for 3 d. I take $\frac{1}{2}$ of the same 36 s. 6 d. which is 18 shillings 3 d. these two sums I adde together, and they make 54 s. 9 d. as in the said fourth example is evident.

For 10 d. take first the $\frac{1}{2}$ then the $\frac{1}{3}$ of the whole sum: and adde them together and it is done.

For 11 d. take first $\frac{1}{3}$ for 4 d. secondly, another $\frac{1}{3}$ for other 4 d. and thirdly $\frac{1}{4}$ for 3 d. (of all the whole sum) and adde them together, and that answereth the question.

Or else for 11 d. take first the $\frac{1}{2}$ for 6 d. Then the $\frac{1}{3}$ of the whole sum for 4 d. and finally the $\frac{1}{4}$ of the last product for 1 d. adding them together, and it will be like to the other.

Likewise by the same reason, when you will multiply (by shillings) any number that is under 20 s. you shall have in the product Pounds, if you know the aliquot parts of 20, which are these: 10, 5, 4, 2, and 1. For 10 is the $\frac{1}{2}$ of 20, 5 is the $\frac{1}{4}$ part, 4 is the $\frac{1}{5}$, 2 is the $\frac{1}{10}$, and 1 is the $\frac{1}{20}$. Rule 3.

Then for 10 s. which is the $\frac{1}{2}$ of a pound, you must take the $\frac{1}{2}$ of that number which is to

to bee multiplyed, and you shall have pounds in the product. If there do remain 1, it shall be worth 10 shillings.

For 5 shillings, you must take the $\frac{1}{4}$ of the number which is to be multiplyed, and if there doe remain any units, they shall be fourth parts of a pound, every unit being in value 5 shillings.

For 4 s. you must take the $\frac{1}{5}$ of the number which is to be multiplyed: And if there doe remaine any units, they shall be fift parts of a pound, every unit being worth 4 shillings.

Example.

At 10 *shillings the peece,*
What are 75 *peeces worth?*

37 *lib.* 10 *shil.*

At 5 *shillings the yard,*
What are 89 *yards worth?*

22 *lib.* 5 *shil.*

At 4 *shil. the Ell,*
What are 93 *Ells worth?*

18 *lib.* 12 *shil.*

For 2 shillings, you must take the $\frac{1}{10}$ of the number that is to bee multiplyed. Where-

Wherefore if you will take the $\frac{1}{10}$ of any number, you must separate the last figure of the same number, (which is nearest your right hand) from all the other figures, with a smal strike or dash with a pen. For all the other figures which doe remain towards your left hand from the same figure that you doe separate, shall be the said $\frac{1}{10}$ of a pound: and that figure so separated toward your right hand, shall be so many peeces of two shillings the peece, the which figure must be doubled to make thereof shillings, as by these examples appeareth.

At 2 shil. the lib.
What are 9|8 lib. worth?

9 *lib.* 16 *shil.*

At 2 shil. the dozen,
What are 40|3 dozens worth?

40 *lib.* 6 *shil.*

Hereupon dependeth another exact way for to multiply by shillings (if the number of shillings be even) which is thus: you shall take $\frac{1}{2}$ the number of the same shillings, and convert them into peeces of 2 shillings. Then by the number of this half, you must first multiply the last figure, toward

ward your right hand) of the number which is to be multiplyed. And if there be any tennes in the same product, those must you reserve in your mind: But (if with the same, or else without the same) you do find any digit number, the same digit number shall you double, and put it into the place of shil. Then must you proceed to the multiplication of the other figures, adding unto the product, the tens which you before reserved: and thereof shall come pounds.

Now for your better understanding of this which hath been said, and by the way of example, I will propone unto you this question.

At 8 shillings the grosse, what are 97 grosse worth after the rate?

First in this example I take halfe the number of shil. as before is taught, that is to say, of 8 shillings which is 4 shillings: this 4 shillings I put apart behind a crooked line, right against 97 towards the left hand, as here you may see, and as hereafter appeareth by divers examples.

At 8 *shil. the grosse,*
4) *What will* 9|7 *grosse cost?*
38 *lib.* 16 *shil.*

At

At 6 shil. the yards.

3) *What* 9|9 ?

29 *lib.* 14 *shil.*

At 12 *shil.*

6) *What* 34|5 ?

207 *lib.* 0 *shil.*

At 14 *shil.*

7) *What* 21|0 ?

147 *lib.* 0 *shil.*

Now in the first example, where it is demanded at 8s. the grosse, what are 97 grosse? First the ½ of 8 s. which is 4 s. being set apart behind the crooked line, as before is said: then I multiply the 97 by 4 saying first, 4 times 7 is 28. I double the digit number 8, and that maketh 16, the which 16, I doe put under the line, in the place of shillings, and I keep the 2 tennes in my mind, which here in work doe represent 2 li. Then secondly I multiply 9 by the said 4. and thereof cometh 36 whereunto I adde the 2 li. which before I did reserve, and they make 38. Therefore I put 38, under the line in the place of pounds, and the whole sum will be 38 li. 16 s. Thus much are the 97 grosse worth, at 8 shil. the grosse: the like is to be done of all other.

As

As of 12 shillings in multiplying by 6. Likewise of 6 shillings if you multiply by 3: also of 14 if you multiply by 7. And so of all even numbers after the same manner.

For 1 shilling you must take the $\frac{1}{2}$ of the $\frac{1}{10}$ part of any number that is to be multiplyed.

At 1 *shil.*
What 350?
17 *lib.* 10 *shil.*

And if any thing doth remain they are shillings. Thus by this manner shil. are converted into pounds: for it is even like as though you did divide them by 20 shillings, as by this example in the margent doth appear. Where it is demanded at 1 s. the yard, the peece or any other thing, what are 350 yards or peeces worth.

First I separate the last figure of 350 next to my right hand, which is the 0, with a line between it and the figure 5. Then I make a line under the 35|0, and I take the $\frac{1}{2}$ of 35, after this manner: saying the $\frac{1}{2}$ of 3 is 1, and 1 remaineth, which remain signifieth 10, in that second place: Then I put 1 under the line against 3, and I proceed to the rest, saying the halfe of 15 is 7, (the which 15 came of the 1 that remained, and of the 5 in the first place.) I put 7 under

der the line, right againſt 5, and they make 17 li. The 1 which did laſt remain is 10 s. Now I put 10 s. apart under the line, and the whole ſumme is 17 li. 10 s. ſo much are 350 worth 1 s. the peece.

But when the number of ſhillings is not ſome aliquot part of 20 s. you muſt then convert the ſame number of ſhillings, into the aliquot parts of 20, and make two or three products as need ſhall require, the which muſt be added together after this manner following.

For 3 ſhillings, you muſt firſt take for 2 s. the $\frac{1}{10}$ of the number that is to be multiplyed, then for 1 ſhilling, you muſt take the $\frac{1}{2}$ of the product which did come of the ſame $\frac{1}{10}$ part: and adde theſe two ſums together, as appeareth by this example following.

At 3 s. the peece of any thing, what ſhall 684 peeces coſt me after the rate? Firſt, for 2 ſhillings I take the $\frac{1}{10}$ of 684, which is 68, in ſeparating the laſt figure 4, which I muſt double, and they be 8: I ſet 8 s. apart from the place of pounds, and then I have 68 pounds 8 s. for the $\frac{1}{10}$ part, that is to ſay, for the 2 s. ſecondly,

At 3 ſhil.
What 68|4?
68 *lib.* 8 *ſhil.*
34 *lib.* 4 *ſhil.*
102 *lib.* 12 *ſhil.*

for 1 s. I take the $\frac{1}{2}$ of the product, that is to say, of 68 li. 8 s. which is 34 li. 4 s. and I put the same under the 68 li. 8 shillings. Then finally, I adde those two summes together, that is to say, 68 li. 8 s. and 34 li. 4 s. so they make 102 li. 12 s. and so much are the 684 peeces worth at 3 shil. the peece, as may appear in the preceding margent.

For 6 shil. take $\frac{3}{10}$ of the number which is to bee multiplyed: that is to say, take first $\frac{1}{10}$, then double the product of the same $\frac{1}{10}$, and adde them together. Or otherwise for 4 s. take first the $\frac{1}{5}$ of the number that is to be multiplyed, then for 2 s. take $\frac{1}{2}$ of the product, and adde them together.

Or else take for 5 shillings the $\frac{1}{4}$ of the whole sum, then for 1 shilling take the $\frac{1}{5}$ of the product, and adde them together.

Likewise for 7 shil. take first for 5 shil. the $\frac{1}{4}$, then for 2 shil. take the $\frac{1}{10}$ of the number which is to be multiplyed, and adde them together.

For 8 shillings take the $\frac{1}{5}$ at two sundry times, that is to say, first $\frac{1}{5}$ for 4 shil. and then as much more for other 4 shil. and adde them together.

For 9 shil. take first the $\frac{1}{4}$ and likewise the $\frac{1}{5}$ of the number that is to be multiplyed, and adde them together.

For

For 11 shil. take first the $\frac{1}{2}$ for 10 s. Then for 1 shil. take the $\frac{1}{10}$ of the product, and adde them together, or else for 5 s. take the $\frac{1}{4}$: then for 4 s. take the $\frac{1}{5}$, and lastly for 2 s. take the $\frac{1}{2}$ of the last product, and adde them together.

For 12 shil. take first the $\frac{1}{2}$ for 10 shil: then for 2 s. take the $\frac{1}{5}$ part of the product, and adde them together.

For 13 s. take the $\frac{1}{4}$ then the $\frac{1}{5}$, and again another $\frac{1}{5}$ of the number which is to be multiplyed, and adde the products together, that is to say, first for 5 shil. take the $\frac{1}{4}$: then for 4 s. take the $\frac{1}{5}$. And again another $\frac{1}{5}$ for the other 4 s. and adde the 3 products together. The like is to be done in all others, when the price of the thing which is valued, is onely of shillings, as by these examples following doth plainly appear.

At 6 shil.

What 67 ?

13 *lib.*	8 *shil.*
6	14
20 *lib.*	2 *shil.*

At 7 shil.

What 347 ?

86	15
34	14
121 *lib.*	9 *shil.*

At 8 *shil.*
What 540 ?

108 *lib.*	0 *shil.*
108	0
216 *lib.*	0 *shil.*

At 9 *shil.*
What 230 ?

57	10
46	00
103 *lib.*	10 *shil.*

At 11 *shil.*
What 159 ?

79	10
7	19
87 *lib.*	9 *shil.*

At 12 *shil.*
What 349 ?

174	10
34	18
209 *lib.*	8 *shil.*

At 13 *shil.*
What 267 ?

66	15
53	8
173 *lib.*	11 *shil.*

Likewise

Likewise in multiplying by pence, you shal have (at the first instant) pounds in the product, in case you know the aliquot parts of the $\frac{1}{10}$ of a pound, or of 24 pence, which are these 12, 8, 6, 4, 3, and 2. For 12, is the $\frac{1}{2}$ of 24. 8 is the $\frac{1}{3}$: 6 is the $\frac{1}{4}$: 4 is the $\frac{1}{6}$: 3 is the $\frac{1}{8}$: and 2 is the $\frac{1}{12}$: but for 12 d. which is 1 shil. I have before made mention thereof.

For 8 d. you must take the $\frac{1}{3}$ of the $\frac{1}{10}$ and the rest which are the peeces of 8 d. must be doubled to make of them peeces of 4 d. And of the same number being doubled, you must take the $\frac{1}{3}$ which will be shillings, and if there doe yet remain any thing, they are thirds of a shilling, being in value 4 pence the peece.

For 6 d. take the $\frac{1}{4}$ of the $\frac{1}{10}$, and of that remaineth, you must take the $\frac{1}{2}$ which shall be shillings: if there doe yet remain 1, it shall be in value 6 d.

For 4 d. you must take the $\frac{1}{6}$ of the $\frac{1}{10}$ and of that which resteth take the $\frac{1}{3}$. to make thereof shillings: if any thing doe yet remain, they are thirds of a shilling, being in value 4 pence the peece.

For 3 pence take the $\frac{1}{8}$ of the $\frac{1}{10}$, and of that remaineth, take the $\frac{1}{4}$ to make of them shillings: if any thing doe yet remaine,

they are fourths of a ſhilling, every one of them being worth 3 d.

For 2 d. take the $\frac{1}{12}$ of the $\frac{1}{10}$, and of that which reſteth, take $\frac{1}{2}$ the which are ſhillings, if there doe ſtill remaine any thing, then ſhall be ſix parts of a ſhil. every one being in value 2 d.

For 1 d. you ſhall underſtand that it is not poſſible with eaſe to bring of d. pounds (into the product) upon the totall ſum: But firſt you muſt bring them into ſhil. by the order of the ſecond Rule of this Chapter, and then afterward you ſhall convert them into pounds, if need ſo require, as by theſe examples following may appeare.

At 8 *d.*
What 59|6?

19 *lib.* 17 *ſhil.* 4 *d.*

At 6 *d.*
What 67|8?

16 *lib.* 19 *ſhil.*

At 4 *d.*
What 93|4?

15 *lib.* 11. *ſhil.* 4 *d.*

At 3 *d.*
What 57|1?

7 *lib.* 2 *ſhil.* 9 *d.*

At 2 *d.*
What 36 | 4 ?

3 *lib.* 0 *shil.* 8 *d.*

At 1 *d.*
What 67 | 6 ?

5 *lib.* 12 *shil.* 8 *d.*

2 *lib.* 16 *shil.* 4 *d.*

But if the number of pence, be not an aliquot part of 24 pence, then must you bring them into the aliquot parts of 24, and make thereof divers products, which must be added together, as shall hereafter appear.

For 5 pence, you shall first take the 3 pence, then for 2 pence, and adde them together, according to the instruction of the last Rule. Or else, first take for 4 pence, and then for 1 d.

For 7 d. first take for 4 d. then for 3 pence, and adde them together.

For 9 d. take first for 6 d. then for 3 pence, adding them together.

For 10 d. first take for 6 d. then for 4 pence, and adde them together.

For 11 d. take first for 8 d. then for 3 pence, and adde them together: as by these examples following doth appeare.

At 5 *d.*
What 92 | 7 ?

11	11	9
7	14	6

19 *lib.* 6 *shil.* 3 *d.*

At 7 *d.*
What 51 | 2 ?

8	10	8
6	8	0

14 *lib.* 18 *shil.* 8 *d.*

At 9 *d.*
What 54 | 6 ?

13	13	0
6	16	6

20 *lib.* 9 *shill.* 6 *d.*

At 10 *d.*
What 27 | 3 ?

6	16	6
4	11	0

11 *lib.* 7 *shil.* 6 *d.*

At 11 *d.*
What 26 | 4 ?

8	16	0
3	6	0

12 *lib.* 2 *shil.* 3 *d.*

Rule 6. If you will multiply any number by shil-lings,

lings, and pence being both together, you must take first for the s. according to the instruction of the third rule of this first chapter, then take for the pence after the order of the 5 rule before mentioned: but if there be any aliquot parts of 1 l. containing both shillings and pence, then for those parts you shall take such like part of the number that is to be multiplied as the number is part of 1 li. the which aliquot parts are these, 6 s. 8 d. 3 s. 4 d. 2 s. 6 d: and 1 s. 8 d. For 6 s. 8 d. is the $\frac{1}{3}$ of a li. 3 s. 4 d. is the $\frac{1}{6}$ of a li. 2 s. 6 d. is the $\frac{1}{8}$: and 1 s. 8 d. is the $\frac{1}{12}$ of a li. or of 20 s. And therefore for 6 s. 8 d. you must take the $\frac{1}{3}$ of the number that is to be multiplied: and if any thing doe remaine, they are thirds of a li. every one being worth 6 s. 8 pence.

For 3 s. 4 d. you must take the $\frac{1}{6}$ of the number which is to be multiplied, and if any thing doe remaine, they are six parts of a li. every one being in value 3 s. 4 d.

For 2 s. 6 d. you must take the $\frac{1}{8}$: if any thing be remaining they are 8 parts of a li. each one being worth 2 s. 6 pence.

For 1 s. 8 d. you shall take the $\frac{1}{12}$, the number that is to be multiplied, and if there doe any thing remaine, they are twelve parts of a Pound, every one being in value 1 shilling 8 pence.

At

At 6 shil. 8 *d.*
What 647 ?

215 *lib.* 13 *shil.* 4 *d.*

At 3 *shil.* 4 *d.*
What 220 ?

36 *lib.* 13 *shil.* 4 *d.*

At 2 *shil.* 6 *d.*
What 47 ?

5 *lib.* 17 *shil.* 6 *d.*

At 1 *shil.* 8 *d.*
What 400 ?

33 *lib.* 6 *shil.* 8 *d.*

Rule 7. Here shall you accustome your selfe to multiply by all sorts of Summes, being composed of shillings, and pence, which may come in use or practise. As thus, for 1 s. 1 d. for 1 s. 2 d: 1 s. 3 d. for 1 s. 4 d: Likewise for 2 s. 1 d. 2 s. 2 d. 2 s. 3 d. 2 s. 4 d. And so of all other, considering moreover, many subtile abbreviations, which happen often times, that are easie to be conceived. As thus 11 s. 3 d, after that I have taken first the $\frac{1}{2}$ for 10 s. Then for 1 s. 3 d. I take the $\frac{1}{8}$ of the product, because 1 s, 3 d. is the $\frac{1}{8}$ of 10 s. in taking the said $\frac{1}{8}$ of the product. And by this means, when ye have taken one product, ye may often-times

times upon the same take another more briefely then upon the summe that is to be multiplied, which thing you must foresee.

At 11 *shil.* 3 *d.*
What 53 ?

26	10	0
3	6	3

29 *lib.* 16 *shil.* 3 *d.*

At 6 *shil.* 3 *d.*
What 58 ?

14	10	0
3	12	6

18 *lib.* 2 *shil.* 6 *d.*

At 12 *shil.* 8 *d.*
What 64 ?

32	0	0
6	8	0
2	2	8

40 *lib.* 10 *shil.* 8 *d.*

But if you will multiply by pounds, shillings, and pence, being all together; First you must wholly multiply by pounds. Then take for the shillings and pence, as in the 6 rule of this chapter is plainely declared. And as by examples following may appear.

At

At 3 lib. 6 shil. 8 d.
What 49 ?

147	0	0
16	6	8.

163 *lib.* 6 *shil.* 8 *d.*

At 5 lib. 18 shil. 4 d.
What 543 ?

2715.	0.	0.
271.	10.	0.
135.	15.	0.
90.	10.	0.

3212 *lib.* 15 *shil.* 0 *d.*

At 2 lib. 7 shil. 4 d.
What 927 ?

1854	0	0
185	8	0
154	10	0

2193 *lib.* 18 *shil.* 0 *d.*

Rule 9. So these rules doe serve both to buy and sell. As at such a price the ell, the yard, the peece, the pound weight, or any other thing: how much is such a thing, or so many els worth? Likewise they are very necessary to convert all pieces of gold and silver into pounds: for I may as well say, at 4 s. 8 d. the French crowne, what are 135 crowns

crownes worth? as to say at 4 s. 8 d. the yard of cloth, what are 135 yards worth?

When any one of the sums which is to be multiplyed, is composed of many denominations: and the other being of one figure alone: then shall ye multiply all the denominations of the other summe by the same one figure, beginning first with that sum which is least in value towards your hand, and bring the product of those pence into shillings, and the product of the shillings into pounds, as by this example doth appeare. *Rule.* 10.

At 3 *lib.* 9 *shil.* 8 *d. the peece,*
What 7?

24 *lib.* 7 *shil.* 8 *d.*

But (if any of the numbers which are to be multiplyed) there be with it a broken number, you must (according to his denominator) take one or many parts of the other number, as need doth require, and set the number which cometh thereof under the products adding the same together. As thus: At 5 li. 7 s. 8 d. the grosse, what

shall 34 grosse ½ cost? First you shall multiply 5 li. 7 s. 8 pence, by 34 grosse, saying 5 times 34 doe make 170 li. Then for 6 s. 8 d. take the ⅓ of 34, which is 11 li. 6 s. 8 d. Thirdly for 1 s. take 34 shillings which is 1 li. 14 s.

At 5 *lib.* 7 *shil.* 8 *d.*		
What 34½?		
170 *li.*	0 *shil.*	0 *d.*
11	6	8
1	14	0
2	13	10
185 *lib.*	14 *shil.*	6 *d.*

Finally, for the ½ grosse, you must take ½ of the 5 li. 7 s. 8 d. which is 2 li. 13 s. 10 d. And then add your 4 products together, so you shal find, that the 34 groff ½ at 5 pound 7 shil. 8 pence the grosse is worth 185 li. 14 s. 6 d. as appeareth in the example aforesaid.

And as in the last example, you did for the ½ grosse, take halfe of the price (that one grosse was worth) and therefore because 1 grosse is worth 5 pound 7 shillings 8 pence, the ½ grosse must be worth halfe so much. So likewise if you have ⅓ of a grosse, or of any other thing, you must take the ⅓ of the price, that one grosse is worth. And in like manner for the ¼ of any thing, you shall take the ¼ of the price, also if you have ⅕, take the ⅕ of the price that one is worth, and so of all other fractions, as by these examples following doth appear.

At

At 4 *lib.* 6 *shil:* 8 *d.*
What $46\frac{1}{2}$?

184	0	0
15	6	8
2	3	4
201 *lib.*	10 *shil:*	0 *d.*

At 8 *lib.* 0 *shil:* 9 *d.*
What $54\frac{1}{3}$?

432	0	0
1	7	0
0	13	6
2	13	7
436 *lib.*	14 *shil:*	1 *d.*

At 3 *lib.* 16 *shil.* 8 *d.*
What 17^{3}?

51	0	0
8	10	0
5	13	4
1	18	4
0	19	2
68 *lib.*	00 *shil:*	10 *d.*

12 If you will make the proofe of these rules aforesaid, you must first abate the summe of mony (which the fraction of the multiplication doth import) from the totall summe, And divide the rest of the pounds of

of the said totall sum, by the whole multiplcand the fraction onely excepted. And if any thing doe remain after the division is made, that remain shall be multiplyed by 20: and unto the product of that multiplication, you shall adde the shillings which remained of the rest of the totall summe. Again, if any thing doe remaine after the same division, you must multiply the same by 12, and unto the produst adde the pence of the totall summe that remained, if any be left. And thus if ye have truly wrought, you shall find again the higher summe of your question, that is to say, the price that one grosse or any other thing is worth, whereof the question is demanded.

Or otherwise reduce the remaine of the totall summe (the value of the mony that the fraction is worth being first reduced) all into pence, in multiplying the pounds by 20, and the shillings by 12: and adding thereunto the shillings and pence, which are joyned with the remain of the said totall summe if any such be, then divide those pence by the aforesaid number that is to be multiplyed, the fractions of the same number being also abated. So shall you find the price that one peece, one grosse or any other thing is valued at; As in the first of the 3 last

last examples going before, where the total summe is 201 Pounds. 10 shil. from the which I doe debate the price of the half grosse which is 2 li. 3 s. 4 d. the rest is 199 li. 6 s. 8 d. Which being reduced into pence bringeth 47840 d. I divide the same by 46, and thereof cometh 1040 d. Then I divide that 1040 pence by 12, and they bring 86 shillings 8 d. that is to say, 4 li. 6 shillings 8 d. which is the price that one grosse, or any other thing did cost as in that first example doth appeare.

The like is to be done of any manner of thing that is sold by the hundred, after 5 score to the hundred.

As thus: at 12 pound 7 shillings 6 d. the hundred pounds waight, what shall 374 pounds waight cost? You shall first multiply 12 pounds, 7 shillings 6 pence by 3: that is to say, by three hundred. Then for 50 pound waight you shall take the $\frac{1}{2}$ of 12 li. 7 s. 6 d. because 50 li. is the $\frac{1}{2}$ of 100 l. Likewise for 20 li. waight which is the $\frac{1}{5}$ of 100 li. you shall take the $\frac{1}{5}$ of 12 li. 7 s 6 d. Lastly for 4 li. waight you must take the $\frac{1}{5}$ of the last product. This done, *Rule 13.*

At 12 *lib.* 7 *shil.* 6 *d.*
What 374?

37.	2.	6.
6.	3.	9.
2.	9.	6.
0.	9.	10. $\frac{4}{5}$

46 *li.* 5. *shil.* 7 *d.* $\frac{4}{5}$

you must adde all these products into one sum, which wil make the sum of 46 li. 5 s. 7 d. $\frac{2}{5}$: as by the example before doth appear.

The proof is made by reducing the totall sum into pence. And to divide the product by the number that is to be multiplied, that is to say, by 374, likewise divide the quotient produced of that first division by 12: so shall you find again the higher sum 12 li. 7 s. 6 d. which is the price of a 100 li. waight, as before.

Also the like may be done of our usuall waight here in England (which is 112 li. for every hundred Pound waight) in case you know the aliquot parts of a 100, that is to say, of 112 li. waight, which are these, 56 li. 28 l. 14 l. and 7 li. For 56 li. is the $\frac{1}{2}$ of 112: 28 li. is the $\frac{1}{4}$ of 112 li. 14 li. is the $\frac{1}{8}$ and 7 li. is the $\frac{1}{16}$.

Therefore for 56 li. take the $\frac{1}{2}$ of the sum of mony that the 112 pound waight is worth.

For 28 li. take the $\frac{1}{4}$ of the Summe of mony that the 112 li. is worth.

For 14 li. take the $\frac{1}{8}$ of the summe that the C. is worth.

For 7 li. take the $\frac{1}{16}$ of the sum of mony that the C. is worth.

As thus, at 3 li. 6 s. 8 d. the hundred pounds waight, that is to say, the 112 li. what shall 24 hundred 3 quarters 21 li. waight cost after the rate? First

First, you shall multiply 24 hundred by 3, which is the 3 li. and thereof will come 72 li. then for 6 s 8 d, which is the $\frac{1}{3}$ of 10 s, you shall take the $\frac{1}{3}$ of 24, which is 8 li. for 24 Nobles, maketh 8 li. afterward, for the 3 quarters of the C. you shall first for the 56 li. take the $\frac{1}{2}$ of 3 li. 6 s. 8 d. because 56 li. is the $\frac{1}{2}$ of the C. and thereof commeth 1 li. 13 shil. 4 d. then for 28 li. (which is the quarter of a C.) you shall take the $\frac{1}{4}$ of 3 li. 6 s. 8 d. or else the $\frac{1}{2}$ of the product, which cometh last of 56 li. which is 16 s. 8 d. likewise for 14 li. you must take the $\frac{1}{8}$ of 3 li. 6 s. 8 d. which is 8 s. 4 d. or else the $\frac{1}{2}$ of the product that cometh of 28 li. which is all one. Finally for 7 li. take the $\frac{1}{16}$ of 3 li. 6 s. 8 d. or else the $\frac{1}{2}$ of the last product that cometh of 14 li. and thereof cometh 4 s. 2 d. Then adde all these products together: and the totall summe will be 83 li. 2 s. 6 d. so much are the 24 C. 3 quarters, and 21 li. waight worth after 3 li. 6 s. 8 d. the hundred, as appeareth in the margent.

At 3 lib. 6 shil. 8 d.

What 24 C.	*3 qu.*	*21 li*
72	0	0
8	0	0
1	13	4
	16	8
	8	4
	4	2
83 li.	*2 shil.*	*6 d.*

The proofe hereof is made, like to the other proofes aforesaid, saving that where, in those proofes you abate the price of the mony, that the fraction was worth, from the totall summe. Here in this example (and in such other like) you must abate the price of the mony, that the odde waight amounteth unto (over and above the just hundreds) from the totall sum: the rest thereof shall you convert into pence, dividing the product of the multiplication by the just number of the number of the hundreds, so shall you find the pence, that one hundred is worth: which you shall bring into pounds by the order of division, and so of all other.

Chap. 2.

Of the Rule of Three composed, the which is distinct into Foure Rules, each of them differing, the one from the other.

There belongeth to the first and second parts of the Rule of three composed alwayes 5 numbers: whereof (in the first part of the Rule of three composed) the second number and the fift, are

are allwayes of one semblance and like denomination: whose rule is thus. You must multiply the first number by the second, and that shall be your divisor, then multiply the other three numbers the one by the other to be your dividend. *Rule 1.*

Example of this first part, if 100 Crownes in 12 Monethes, doe gain 15 li. what will 60 Crowns gain in 8 Monethes? Answ. First multiply 100 Crownes by 12 monethes, and thereof cometh 1200 for your divisor, then multiply 15 li. by 60 crowns, and by 8 monethes, and you shall have 7200; wherefore divide 7200 by 1200, and thereof cometh 6 li; so many li. will 60 crowns gain in 8 months: this Question may be done by the double rule of 3, that is to say, by the rule of 3 at 2 times. But yet this rule of 3 composed is more briefe.

Crowns.	*Months.*	*Pounds.*	*Crowns.*	*Months.*
100	12	15	60	8

~~7~~

~~72~~|00

~~12~~|00 *6 lib.*

2 In the second part of the rule of three composed, the 3. number is like unto the fift, whereof the rule is thus, you must multiply the third number by the 4, and the product shall be your divisor, then multiply

 the

the first number by the second, and the product thereof by the fift, the which number shall be your dividend, or number that is to be divided: as by example.

When 60 crowns in 8 months do gain 6 li. in how many months will 100 crowns gain 15 li.? Answer. Multiply the third number 6 by the fourth number 100: and thereof cometh 600, which shall be your divisor: then multiply the first number 60 by the second number 8, and the product thereof by the fift number 15 and thereof will come 7200: then divide 7200, by 600, and the quotient will be 12, in so many months will 100 crowns gain 15 li. This question may likewise be done by the rule of 3, at 2 times.

Crowns.	*Months.*	*Pounds.*	*Crowns.*	*Pounds.*
60	8	6	100	15

x

72|00 *Months.*

~~66~~|00 (12

In the third part of the Rule of three composed there may be 5 numbers, or more: and in this rule the first number and the last are alwayes dissemblant and of unlike denomination, the one to the other: and the question

question is from the last number unto the first, whereof the rule is thus, you must multiply that number which you would know by those numbers which doe give the value, and divide the product of the same by the multiplication of the numbers which are already valued, as by example. If 4 deniers Parisis be worth 5 deniers Tournois, & 10 deniers Tournois, be worth 12 deniers of Savoy, I demand how many deniers Parisis are 8 deniers of Savoy worth? Answ. Multiply 8 deniers of Savoy (which is the number that you would know) by 4 deniers Parisis, & by 10 deniers Tournois which are the numbers that give the value, and they make 320: then multiply 5 deniers Tournois, by 12 deniers of Savoy which are the numbers already valued, and they make 60: Finally divide 320 by 60, and you shall find 5 deniers $\frac{1}{3}$ Parisis, so much are the 8 deniers of Savoy worth. *Rule 3.*

Parisis.	*Tournois.*	*Tournois.*	*Savoy.*	*Savoy.*
4 *d.*	5 *d.*	10 *d.*	12 *d.*	8 *d.*

32|0 *par.*

6|0 (5 *d.* $\frac{1}{3}$.

In the fourth part of the rule of 3 composed: the first number & the last are always

 semblant

semblant and of one denomination, and the question of this rule, is alwayes from the last number to that last saving one, whereof there is a rule which is thus. You must multiply the number which you would know, by the numbers that are already valued, and divide the product of the same, by the multiplication which commeth of the numbers that give the value, as by example.

Rule 4.

If 4 deniers Parisis, be worth 5 deniers Tournois, and 10 deniers Tournois, be worth 12 deniers of Savoy: I demand how many deniers of Savoy, are 15 deniers Parisis worth? Answer. Multiply 15 Deniers Parisis that you would know, by 5 deniers Tournois, and by 12 Deniers of Savoy, which are the numbers already valued, and they make 900. Divide the same by 4 times 10, which are the numbers that doe give the value, that is to say, by 40, and you shall find 22 Deniers $\frac{1}{2}$ of Savoy: so much are the 15 Deniers Parisis worth.

Parisis.	Tournois.	tournois.	Savoy.	Parisis.
4 *d.*	5 *d.*	10 *d.*	12 *d.*	15 *d.*

x2|
ØØ|0 *Savoy.*
44|0 22 D. $\frac{1}{2}$.

The

The third Chapter treateth of Questions of the trade of Merchandize, in the which is taught the rule of Three in Fractions, beginning at the Question following.

If 31 Devonsh. Dozens, doe cost me 100 li. 15 s. what shall 4 Dozens cost after the same rate? Answer. First bring the 100 li. 15 s. all into shillings, in multiplying the 100 li. by 20, and adding to the product the 15 shil. and thereof cometh 2015 shil. then multiply 2015 by the third number 4, and divide the product by 31, and the quotient will be 260 s. The which divide again by 20, and thereof cometh 13 li. And so much are the 4 Dozens worth.

Dozens.	*Lib.*	*shil.*	*Dozens.*
31	100	15	4
	20		
	2015		
	4		
	8060		

~~1~~
~~2~~8
~~8060~~ (260
~~3111~~
~~33~~

dozens lib dozens
31 100 15 4
20
2015
4
8060
1
28
8060 (260
3111
33
260 (13
20
2

If 4 dozens be worth 13 li. what are 31 Dozens worth by the price? Ans. Multiply 31 by 13, and thereof cometh 403. The which you shall divide by 4, and thereof cometh 100 li. ¾ which ¾ are 15 s. and so much are 31 Dozens worth, as before.

Dozens.	lib.	Dozens.
4	13	31
		13
		93
		31
		403

4 13 31
13
93
31
403

403
444 (100 li. ¾.
4

4 0 3 (100
4 4 4

3. If 49 Elles be worth 2 li. 4 s. 11 d. what are 18 Elles worth by the price? First you must bring 2 li. 4 s. 11 d. all into pence, in multiplying 2 li. by 20 maketh 40: adde thereto 4 shillings they make 44 s. the which multiply by 12 d. and they make 528 d. whereunto adde 11 d. all is 539 d. the which 539 d. must be your second number in the rule of three, then multiply 539 by the third number 18, and thereof cometh 9702, divide the same by 49, and you shall have in your quotient 198 d. the which divide by 12, and you shall find 16 s.

1 7 6
1 9 8 (16
1 2 2
1

s. 6 pence : so much are the 18 Elles worth.

Elles.	lib.	shil.	d.	Elles.
49	2	4	11	18
	20			539
	44			18
	12			4312
	88			539
	441			9702
	1			

539

13	x
427	76
588	198 (16 shil. 6 d.
9702 (198.	122
4999	x
44	

l s d
2-4 11
2
20
44
12
88

4 If 18 Elles be worth 16 s. 6d. what are 49 Elles worth by the price? Answer. Bring 16 s. 6 d. into pence in multiplying 16 by 12, and thereof cometh 198 d. with the 6 d. added to it, then multiply 198 d. by 49, the product will bee 9702. The which divide by 18 Elles, and thereof cometh 539 s. Then divide 539 by 12, and the product thereof by 20: So shall you have

44
12
88
44
528
11
539

198

539
18

9702

2 li. 4 shil. 11 d. and so much are the 49 Elles worth.

Elles.	*shil.*	*d.*	*Elles.*
18	16	6	49
	12		198
	32		392
	166		441
	198		49
			9702

~~17~~	1
~~446~~	~~151~~
~~9702~~ (539	~~539~~ (44 *shil.*
~~1888~~	~~122~~
~~11~~	~~1~~
539	

Note that whereas in the first part of this Book, I have set forth the rule of three both in whole numbers, and also in fractions: now I will shew you how to doe the said Rule of Three, in fractions more at large. And because I would have you to understand the same generally, you must first consider if the three numbers that shall be proponed (in any question of the said rule of three) be all fractions, yea, or no: which if they be all 3 numbers fractions, then must you work as followeth.

First you must multiply the Numera-

tors

tors of the second and third fractions in your rule of Three, the one by the other, and again you must multiply that product, by the denominator of the first fraction: and the number which cometh of this last multiplication, shall be your dividend, or number that must be divided.

Secondly, you must multiply likewise the denominators of the second and third fractions in your said Rule of three, the one by the other, and the off-come again by the numerator of the first fraction. And the number which is produced of that multiplication, shall be your divisor.

Thirdly you must divide the aforesaid dividend by the divisor, and the quotient will be the answer to the question, as by Examples shall hereafter appear.

But if you find whole numbers and fractions together, in the said Rule of three: you must first reduce the same into their fractions by the 6 reduction.

Likewise if you find any of the three numbers in your rule of three, to be whole numbers, alone without any fraction joyned with it, you must in this case put 1 under the same whole number with a line between them both: The which 1 doth represent the denominator to the same whole number,

number, and then you muſt proceed to worke the Rule of three in like manner, as though they were all fractions: as before is ſaid.

The Examples of all three differences aforeſaid, doe follow in the Three next queſtions orderly.

If $\frac{2}{3}$ X $\frac{4}{5}$ $\frac{7}{8}$: I doe underſtand thereby thus as followeth. If $\frac{2}{3}$ of any waight, or meaſure be worth $\frac{4}{5}$ of twenty s. or of any other Sum, what are $\frac{7}{8}$ of the like waight or meaſure worth after the rate? Anſwer. Firſt, as is ſaid before, I doe multiply the numerators of the ſecond and third fractions, the one by the other: that is to ſay, 7 by 4, and they make 28: again, I doe multiply the ſaid 28 by the denominator of the firſt fraction, that is to ſay, by 3, and thereof cometh 84, the which 84, I ſet over the croſſe for my dividend. Secondly, I doe multiply the denominators of the ſecond and third fractions the one by the other: Namely 8 by 5, and they make 40: again I doe multiply the ſaid 40 by the numerator of the firſt fraction: that is to ſay, by 2, and thereof cometh 80, the ſame 80 I doe ſet under the croſſe for my diviſor. Then I divide 84 by 80, and there cometh in

in the quotient 1 li. and $\frac{4}{80}$ remaining, the which $\frac{4}{80}$ being abbrevied, maketh $\frac{1}{20}$ of a pound, which is worth 12 d. And so much will the aforesaid $\frac{7}{8}$ cost, as by the work following, doth appeare.

```
        84            | 7
  2           4     7 | 4
  -    X      -  ---- |28
  3           5     8 | 3
        80            |84

  8|
  5|84
 40|80 (1 4/80.
  2|
 80|
```

6. If $\frac{2}{5}$ of an Ell of any merchandize do cost me 12 shillings 7 d. the which 7 d. doth make $\frac{7}{12}$ what will $\frac{9}{16}$ of an Ell cost me after the same rate? Answer. First I set down my numbers as followeth. If $\frac{2}{5}$ X 12 $\frac{7}{12}$, $\frac{9}{16}$. Then by the 6 reduction I reduce 12 $\frac{7}{12}$ all into Twelves, and they make $\frac{151}{12}$ for the second number in my rule of 3, which must stand in the place of 12 $\frac{7}{12}$. And then will my 3 numbers stand thus as followeth, $\frac{2}{5}$ X $\frac{151}{12}$, $\frac{9}{16}$. Then I multiply 151 by 9, and the off-come by 5, and thereof

cometh

cometh 6795, the which I doe set over the crosse for my dividend. Likewise I multiply 12 by 10, and the off-come by 2, and thereof cometh 240: which I doe set under the crosse for my divisor. Then I divide 6795, by 240: and thereof cometh in the quotient 28 shillings, and 75 remaining, the which 75 because it is the remain of s. I doe multiply it by 12 pence, for that there is 12 pence in a shilling, and thereof cometh 900. The same 900, I divide again by 240, and thereof cometh 3 pence, and 180 remaining, which 180 I doe set apart over 240, with a line between them both, and they are $\frac{180}{240}$. The which being abbrevied, doe make $\frac{3}{4}$ of a penny. And thus I find that the $\frac{9}{10}$ of an Ell shall cost 28 s. 3 d. $\frac{3}{4}$, as appeareth.

151	12		6795			
	12					
7	24	2	X	151		9
12—	127	5		12		10
12	151		240			

151	12	3
9	10	297
1359	120	6795. (28 shil.
5	2	2400
6795	240	24

75

75 | 1
12 | 38
150 | 900 (3 d. $\frac{180}{240}$
70 | 240
900 | $\frac{3}{4}$

7 If $\frac{3}{5}$ of an Ell doe cost me 8 shillings, what will 7 Ells $\frac{1}{2}$ cost me after the rate? Answer. I doe first reduce the whole number and broken into his broken by the first Reduction, that is to say 7 $\frac{1}{2}$ into halfes, and they are $\frac{15}{2}$, which must bee the third number in my rule of three, the second number is 8 shillings, but I must (as before is taught) put 1 under 8 with a line between them, to make it like a fraction thus, $\frac{8}{1}$. Then must my three numbers in my Rule of three, stand after this manner: $\frac{3}{5}$ X $\frac{8}{1}$. $\frac{15}{2}$. Then I doe multiply 15 by 8, & the product thereof by 5, amounteth 600: The which I doe set over the crosse, for my dividend. Likewise I doe multiply 2 by 1, and the product thereof by 3, and thereof cometh 6, the which I doe set under the crosse for my divisor. Then I divide 600 by 6, and I find in my quotient 100: the which is 100 shil. I do therefore divide 100 by 20 s. and my quotient is 5 li. And so much will the 7 Ells $\frac{1}{2}$ cost me, as hereafter doth appear.

$$7\tfrac{1}{2}\ \begin{array}{|c|}7\\ \hline 2\\ 14\\ \hline 1\\ \hline 15\end{array}\ \frac{3}{5}\ \overset{600}{\underset{6}{\mathrm{X}}}\ \frac{8}{1}\ \text{———}\ \frac{15}{2}\ \text{———}$$

$$\begin{array}{cc|l} 15 & 2 & \\ 8 & 1 & 600 \\ \hline 120 & 2 & 666\ (100\ \textit{shil.}\ \Big|\ \begin{array}{l}100\\ 20\end{array}\ (5\ \textit{lib.} \\ 5 & 3 & \\ \hline 600 & 6 & \end{array}$$

If 1 yard of Velvet cost 19 shillings, what shall ¾ of a yard cost? Answer. Set down your numbers thus: If $\frac{1}{1}$ X $\frac{19}{1}$. Then multiply 1 times 19, by 3: and thereof cometh 57 for your dividend, or number to bee divided. The which 57 you shall divide by 1 times 1, 4 times, which are 4, and your quotient will be 14 s. ¼, which ¼ is worth 3 d. so much are the ¾ of a yard worth after 19 shillings the yard, as by practise followeth.

$$\frac{1}{1}\ \overset{57}{\underset{4}{\mathrm{X}}}\ \frac{19}{1}\text{———}\frac{3}{4}\ \Bigg|\ \begin{array}{l}11\\ 57\ (14\ \textit{shil.}\ \tfrac{1}{4}\\ 44\end{array}$$

Or otherwise by the rules of practise: first

first for $\frac{2}{4}$ of a yard which is $\frac{1}{2}$ of a yard, you must take the $\frac{1}{2}$ of 19 shillings, which is 9 s. 6 d. then for $\frac{1}{4}$ of a yard take the $\frac{1}{2}$ of the product, that is to say, of 9 s 6 d. and thereof cometh 4 s 9 d. adde these numbers together, and you shall had 14 s. 3 d. as above is said, and as appeareth here in the margent.

19 *shil.*	
9 *shil.*	6 *d.*
4	9
14	3

9 If $\frac{3}{4}$ of a yard of Velvet doe cost 14 s. 3 d. what shall 1 yard cost? Answer. Set your numbers downe thus: If $\frac{3}{4}$ X $14\frac{1}{4}$. $\frac{1}{1}$. Reduce $14\frac{1}{4}$ into a fraction, and they will be $\frac{57}{4}$, then multiply 57 by 1, 4 times, and thereof cometh 228 for your dividend. Likewise multiply 1 times 4 3 times, and thereof cometh 12 for your divisor: then divide 228 by 12, and your quotient will be 19 s. so much is the yard of Velvet worth.

228

$\frac{3}{4}$ X 57 — 1 | $14\frac{1}{4}$. 1

12

1
10
228 (19 shil.
122
1

Or otherwise by the Rule of practise: you shall take the $\frac{1}{3}$ part of 14 shillings 3 d.

 which

which is 4 s. 9 d. and adde it with the same 14 s. 3 d. and you shall have 19 shillings as before.

14 *shil.*	3 *d.*
4	9
19 *shil.*	0 *d.*

10 If one Ell of Holland cloth be worth 5 s. what are $\frac{2}{3}$ worth after the rate? Ans. Say thus, if $\frac{1}{1}$ X $\frac{5}{1}$. $\frac{2}{3}$. Then multiply 2 times 5, one time, and thereof cometh 10 for your dividend: likewise multiply 3 time 1, one time, they make 3 for your divisor, then divide 10 by 3, and thereof cometh 3 s. $\frac{1}{3}$, which $\frac{1}{3}$ is worth 4 d. and so much are the $\frac{2}{3}$ of an Ell worth.

10

$\frac{1}{1}$ X $\frac{5}{1}$ ——— $\frac{2}{3}$ | $\frac{1}{3}$ | $\cancel{10}$ (3 *shil.* $\frac{1}{3}$.
$\cancel{3}$

3

Or otherwise, by the rule of practise: take first the $\frac{1}{3}$ of 5 s. for the $\frac{1}{3}$ of an Ell and that is 1 s. 8 d. likewise, for the other $\frac{1}{3}$ of an Ell, take again another $\frac{1}{3}$ of 5 s. which is also 1 shilling, 8 pence, and adde them together, and so shall you have 3 s. 4 d. as before.

5 *shil.*

5 *shil.*		
1	8	
1	8	
3 *shil.*	4 *d.*	

11 If $\frac{2}{3}$ of an Ell of Holland cloth doe cost me 3 s. 4 d. what shall 1 Ell cost? Ans. Set down your numbers thus: if $\frac{2}{3}$ X 3 $\frac{1}{3}$, $\frac{1}{1}$. First reduce 3 $\frac{1}{3}$ all into thirds, and it will be $\frac{10}{3}$. Then multiply 1 times 10, 3 times, and thereof cometh 30 for your dividend. Likewise multiply 1 times 3, 2 times, and your divisor will be 6, then divide 30 by 6, and you shall have 5 shil. so much is the Ell of Holland cloth worth.

$$\begin{array}{ccccc} & 30 & & & \\ \frac{2}{3} & \times & 10 & 1 & \frac{30}{6}\ 5\ \textit{shil.} \\ & & 3\frac{1}{3} & 1 & \\ & 6 & & & \end{array}$$

Or otherwise by practise, take the $\frac{1}{2}$ of 3 s. 4 d. which is 1 shilling 8 pence, and adde it to the same 3 shillings, 4 d. and thereof will come 5 s. as before. For the $\frac{1}{3}$ of 5 s. is as much as the $\frac{1}{2}$ of 3 s. 4 d. which was the price that the $\frac{2}{3}$ of an Ell did cost, as appeareth.

3 *shil.*	4 *d.*
1	8
5 *shil.*	0 *d.*

12 If one Ell cost me 17 s. what shall 15 Elles $\frac{1}{8}$ part cost? which $\frac{1}{8}$ is halfe a quarter of an Ell. Answer. Say if $\frac{1}{1}$ X $\frac{17}{1}$. 15 $\frac{1}{8}$. First reduce 15 $\frac{1}{8}$ into eight parts, and they make $\frac{121}{8}$ then multiply 121 by 17, 1 time, & thereof cometh 2057, for your dividend. Likewise multiply 8 times 1, 1 time, and the product will be 8, for your divisor, then divide 2057 by 8, and you shall find 257 shi. $\frac{1}{8}$, which is 12 li. 17 s. 1 d. $\frac{1}{2}$, and so much are the 15 Ells $\frac{1}{8}$ worth, as by practise doth appear in the example following.

$$\begin{array}{ccccc} & 2057 & & & \\ \frac{1}{1} & \mathbf{X} & \frac{17}{1} & \text{———} & \frac{121}{15\frac{1}{8}} \\ & 8 & & & \end{array}$$

Or otherwise, for 10 s. take the $\frac{1}{2}$ of 15, which is 7 li. 10 s. then for 5 s. take the $\frac{1}{2}$ of 7 li. 10 s. which is 3 li. 15 s. Thirdly, for 2 s. take the $\frac{1}{5}$ of 7 l. 10 s. because the $\frac{1}{5}$ of 10 s. is 2 s. Fourthly, for the $\frac{1}{8}$ of the Ell, you shall take the $\frac{1}{8}$ of 17 shillings, which is 2 shillings 1 penny $\frac{1}{2}$.

Then adde all these sums together, and you shall find 2 li. 17 s. 1 d. $\frac{1}{2}$

15 $\frac{1}{8}$		
17		
7	10	0
3	15	0
1	10	0
	2	1 $\frac{1}{2}$.
12 *li.*	17 *shil.*	1 *d* $\frac{1}{2}$.

as

as before, and as appeareth more plainly in the former practise.

13 If 25 Elles be worth 2 li. 3 s. 4 d. what are 18 Elles $\frac{3}{4}$ worth by the price? Answer. First put 3 s 4 d. into the part of a li. and you shall have $\frac{1}{6}$: then say if $\frac{25}{1}$ give me 2 li. $\frac{1}{6}$, what shall 18 $\frac{3}{4}$ give? put the whole numbers 6 into their broken, and then multiply 1 times 13 by 75, the product will be 975, the which you shall divide by 25 times 6, 4 times: which maketh 600. Then divide 975 by 600: and your quotient will be 1 li. and 375 will remaine, the which 375 you shall multiply by 20, and thereof will come 7500. divide the same by 600, your quotient will be 12 s. and 300 will remain, the which abbrevied is $\frac{1}{2}$ which is 6d: thus the 18 Ells $\frac{3}{4}$ are worth, 1 li. 12 s 6 d, as by practise will appeare.

$$\frac{13}{\frac{25}{1} \times 2\frac{1}{6}} \qquad \frac{75}{18\frac{3}{4}}$$

Or otherwise by the rules of practise, for because that 12 Ells $\frac{1}{2}$ is the $\frac{1}{2}$ of 25 Elles, therefore take the $\frac{1}{2}$ of 2 li 3 s 4 d. which is 1 l. 1 s 8 d. then for 6 Elles $\frac{1}{4}$ take the $\frac{1}{4}$ of 2 li 3 s 4 d, or else the $\frac{1}{2}$ of the last product, (that is to say, of 1 l. 1 s 8d) which is all

one, and adde them together, so shall you have 1 li. 12 s. 6 d. as before.

lib.	shil.	d.
2	3	4
1	1	8
	10	10
1 lib.	12 shil.	6 d.

14 If 15 yards be worth 32 s, what are halfe a yard and halfe a quarter, or else $\frac{5}{8}$ of a yard worth? Answer. Say if $\frac{15}{1}$ give $\frac{32}{1}$, what will $\frac{5}{8}$ give? Multiply 1 times 32 by 5, and divide the product by 15 times 8 times, and your quotient will be 1: and $\frac{40}{120}$ remaining, which is $\frac{1}{3}$ of a shilling, that is to say 4 d, & so much are the $\frac{5}{8}$ of a yard worth, that is to say 1 s. 4 d.

$$\frac{15}{1} \times \frac{32}{1}\ \frac{5}{8}$$

Or otherwise, see what the yard is worth after the manner aforesaid in the other examples, and you shall find that the yard is worth 2 s. 1 d $\frac{3}{5}$: of the which number take first the $\frac{1}{2}$ for $\frac{4}{2}$, which is 1 s 0 d $\frac{4}{5}$, of the which number, take the $\frac{1}{4}$ for the other $\frac{1}{8}$, which is 3 d $\frac{1}{5}$, adde these two numbers together, and you shall find the $\frac{5}{8}$ to be worth 1 s 4 d, as is before said.

2 shil:

2 *shil:*	1 *d.*	$\frac{3}{5}$
1	0	$\frac{4}{5}$
	3	$\frac{1}{5}$
1 *shil:*	4*d.*	0

15 IF 13 Elles $\frac{5}{8}$ bee worth 27 shillings, what are 10 Els $\frac{2}{3}$ worth by the price? Answer. Say if 13 $\frac{5}{8}$ give $\frac{27}{1}$, what shall 10 $\frac{2}{3}$ give? Put the whole numbers into their broken, and you shall find $\frac{83}{8}$ $\frac{27}{1}$, and $\frac{32}{3}$. Then multiply 6 times 27, by 32, and thereof cometh 5184, the which number you shall divide by 83 times, 1, 3 times, and you shall find 20 shillings, $\frac{68}{83}$, which fraction is worth 8 d $\frac{69}{83}$, parts of a penny.

$$\frac{83}{13\frac{5}{8}} \times \frac{27}{1}. \quad \frac{32}{10\frac{2}{3}}.$$

16 If 2 yards $\frac{1}{2}$ bee worth 4 s 8 d. what are 8 yards $\frac{1}{4}$ worth? Answer. Put the 8 d. into the part of a shilling, setting 8 over 12. and it will be $\frac{8}{12}$ which abbrevied are $\frac{2}{3}$, then reduce whole numbers into 3 broken, and they will stand thus: $\frac{5}{2}$, $\frac{14}{3}$, $\frac{33}{4}$, then multiply 2 times 14 by 33, and divide the product by 5 times 3, 4 times; and you shall find 15 s. and $\frac{24}{60}$ will remaine which are worth 4 pence, $\frac{4}{5}$ so much are the 8 yards $\frac{1}{4}$ worth.

$$\frac{5}{2\frac{1}{2}} \qquad \frac{14}{4\frac{1}{3}} \qquad \frac{33}{8\frac{1}{4}}$$

17 If 1 kersey be worth 2 li. 6 s. 8 d. how many kerseys shall I buy for 36 li. 3 s. 4 d. after the rate? Answer. Put 6 s. 8 d. into the part of a li. and you shall have 2 li. $\frac{1}{3}$, for the first number in the rule of 3, and 1 kersey for the second number: then put 3 s 4 d. into the the part of a li. and it is $\frac{1}{6}$, so you shall have 36 li. $\frac{1}{8}$ for the third number, then will your 3 numbers in the rule of 3 stand thus. $2\frac{1}{4}$ X $\frac{1}{1}$. $36\frac{1}{8}$. Then reduce the whole numbers into their broken, and it will be thus, $\frac{7}{3}$ X $\frac{1}{1}$ $\frac{217}{6}$, Then multiply 3 times 1 by 217, and thereof will come 651 for your dividend. Likewise multiply 7 times 1 by 6: and the product thereof will be 42. Then divide 651 by 42, and you shall find 15 $\frac{1}{2}$. So many kersies of 2 li. 6 s. 8 d. the peece, shall you have for 36 li. 3 s. 4 d.

$$\frac{7}{2\frac{2}{3}} \text{ X } \frac{1}{1} \qquad \frac{217}{36\frac{1}{8}}$$

Of

Chap. 4.

Of losses and gaines in the trade of Merchandize.

1. If 13 yards $\frac{1}{3}$ be worth 22 pound 10 s. how shall I sell 1 yard to gain $\frac{1}{3}$, or to make 3, 4? which is all one. Answ. Say by the rule of Three, if 3 doe yeeld 4. what will 22 $\frac{1}{2}$ yeeld? multiply and divide and you shall find 30 li. Then say again by the rule of 3, if 13 yards $\frac{1}{3}$ doe give 30, li. as well of principall as of gaine: what will 1 yard be worth by the price? Multiply and divide, and you shall find 2 li. 5 s. and for that price must the yard be sold to gaine the $\frac{1}{3}$, or to make of 3, 4.

180

45 | $\cancel{180}$

$\frac{3}{1}$ $\frac{4}{1}$ 22 $\frac{1}{2}$ | $\cancel{6}$ (30.

6

90

40

13 $\frac{1}{3}$ X $\frac{30}{1}$ $\frac{1}{1}$.

40

Or otherwise, take the $\frac{1}{3}$ part of 22 li. 10 s. which is 7 li. 10 s. that shall you adde with 22 li. 10 s. and you shall have

have

have 30 li. as before. Then divide 30 by 13 $\frac{1}{3}$, and you ſhall find 2 li. 5 s. as above is ſaid.

li.	ſhil.
22	10
7	10
30	00

2 If one yard bee worth 27 s. 6 d. for how much ſhall 16 yards $\frac{1}{3}$ bee ſold to gain 2 s. upon the li. of money? that is to ſay, upon 20 s? Anſwer. Adde 2 s. unto 20, and you ſhall have 22, then ſay: If 20 s. principall doe give 22 s, principall and gain: how much will 27 s. 6 d. principall yeeld? Multiply and divide, and you ſhall find 30 s $\frac{1}{4}$: then ſay againe by the rule of 3. If 1 yard doe give me 30 s $\frac{1}{4}$ (which is as well the principall as the gaine) what ſhall 16 yards $\frac{2}{3}$ give me? Multiply and divide, and you ſhall find 25 li. 4 s. 2 d. For the ſame price ſhall the 16 yards $\frac{2}{3}$ be ſold to gain after the rate of 2 s: upon the pound of mony, or upon 20 s. which is all one.

$$\begin{array}{ccc|cc} & & 55 & 121 & 50 \\ \hline \frac{20}{1} \times \frac{22}{1} & & 27\frac{1}{2} & \frac{1}{1} \times 30\frac{1}{4} & 16\frac{2}{3} \end{array}$$

3 If 10 yards $\frac{2}{3}$ be worth 25 li. 10 s. for how much ſhall 2 yards $\frac{1}{4}$ be ſold to gain after 10 l. upon the 100 li. of mony? Anſwer. Say if 100 principall yeeld 110, as well principall as gain, how much will 25 li.

10 shillings yeeld me? Multiply and divide and you shall find 28 li. 1 s. Then say, if 10 yards $\frac{2}{3}$ doe yeeld me 28 li. 1 s. as well principall as gaine, how much shall 2 $\frac{1}{4}$ yeeld me? Multiply and divide and you shall find 5 li. 28 s 4 d. $\frac{1}{11}$, and for so much shall the 2 yards $\frac{1}{4}$ be sold, to gain after 10 li. upon the 100 li. of mony.

$$\begin{array}{cccc} & & 51 & \\ \frac{100}{1} & \times\ \frac{110}{1}. & 25\,\frac{1}{2}. & \\ 32 & 561 & 9 & \\ \hline 10\,\frac{2}{3} & \times\ 28\,\frac{1}{20} & 2\,\frac{1}{4}. & \end{array}$$

And although that in these questions of gain and losse, sometimes the first number is not like unto the third number, that is to say, of the same denomination: for whereas one would say, if 20 s. gaine 2 s. what shall 50 li. gaine? or what shall 25 li. gain, &c. Or if 20 li. doe gain 2 li. what shall 15 s. gain? or what shall 27 s $\frac{1}{2}$ gain? Yet the same doth not prove that the rule is therefore false. For if 20 s. doe gaine 2 s. 20 li. shall gaine 2 li. and 20 d. shall gaine 2 d. likewise 20 crowns, shall gaine 2 crowns, and so of all other. Therefore it is to be understood, that the first number of the rule of three in these reasons, is purposed

ſed to be ſemblable or like to the third in quality or name.

When one Merchant ſelleth wares to another, and he giveth to the buyer 2 upon 15: how much ſhall the buyer gaine upon the 100, after the rate?

Anſw. Firſt adde 2 unto 15, and they are 17, then ſay if 15 give 17, what ſhall 100 give? Multiply and divide and you ſhall find 113 $\frac{1}{3}$, ſo the buyer getteth after the rate of 13 $\frac{1}{3}$ upon the 100.

15 : | 17 : | 100.

4 If one Northern dozen coſt me 3 l. 5 s. I ſell the ſame again for 3 li. 12 s. 6 d. how much doe I gain upon the pound of mony after the rate? Anſwer. Say if 3 li. $\frac{1}{4}$ doe give 3 li. $\frac{5}{8}$ what ſhall $\frac{20}{1}$ give? put the whole number into their broken and you ſhall have $\frac{13}{4}$ X $\frac{29}{8}$ $\frac{20}{1}$, then multiply 4 times 29, by 20: and thereof cometh 2320: for your number that is to be divided: likewiſe multiply 13 times 8, 1 time, and thereof cometh 104. Then divide 2320, by 104 and you ſhall find 22 ſhillings, $\frac{4}{13}$. So I ſhall get 2 s. $\frac{4}{13}$ upon 20 s. or upon the pound of mony.

$$\frac{13}{3\frac{1}{4}} \text{ X } \frac{29}{3\frac{5}{8}} \quad \frac{20}{1}.$$

5 If

5 If a yard of cloth cost me 7 s. 8 d. and afterward I sell of the same cloth 13 yards $\frac{1}{2}$ for 4 li. 13 s. 4 d. I would know whether I doe win or lose, and how much upon the 100 li. of mony? Answer. See first at 7 s. 8 d. the yard what the 13 yards $\frac{1}{2}$ shall cost, and you shall find 5 li. 1 s. 7 d. And I sold the same but for 4 li. 13 s. 4 d. so that I doe lose upon the 13 yards $\frac{1}{4}$, the sum of 8 s. 3 d. Then if you wil know how much is lost in the 100: Say by the rule of three, if 5 li. 1 s. 7 d. doe lose 8 s. 3 d. what will 100 li. lose? First, put 1 s. 7 d. into the part of a li. and it will be $\frac{19}{240}$. Likewise put 8 s. 3 d. into the part of a li. and it is $\frac{33}{80}$. Then will your numbers stand thus: $5\frac{19}{240}$ X $\frac{33}{80}$ $\frac{100}{1}$, reduce the whole into his broken, and then multiply and divide, so you shall find 8 li. $\frac{1216}{9752}$, which fraction is worth 2 s. 5 d. $\frac{1129}{1219}$, and so much is lost in the 100 li. of mony.

$$\overline{5}\ \frac{19}{240}\ \text{X}\ \frac{33}{80}\ \frac{100}{1}$$
1219

6 More, If 12 yards $\frac{1}{2}$ of scarlet, be sold for 30 li. 15 s. upon the which is gained after the rate of 11 $\frac{1}{9}$ upon the 100: I demand what the yard did cost at the first? Ans. from 30 li. 15 s. substract his $\frac{1}{10}$ part which is 3 li. 1 s. 6 d. and there resteth 27 li. 13 s.

s. 6 d. the which number multiplyed by 2 bringeth 55 li. 7 s. of the which number take the $\frac{1}{5}$, which is 11 li. 1 s. and 4 d. & $\frac{4}{5}$. Then take again the $\frac{1}{5}$ of the said 11 pound, 1 shilling 4 d. $\frac{4}{5}$, which is 2 li. 4 shillings 3 pence, $\frac{9}{25}$. And so much did the yard cost at the first penny.

30 *lib.*	15 *shil.*	0 *d.*
3	1	6
27	13	6
2	0	0
55	7	0
11	1	4 $\frac{4}{5}$.
2 *lib.*	4 *shil.*	3 *d.* $\frac{9}{25}$

7 More, if 15 yards $\frac{3}{4}$ of scarlet, doe cost me 32 li. 13 s. 4 d. And I sell the yard again for 2 li. whether doe I winne or lose, & how much in or upon the pound of mony?

Answer. Look what the 15 yards, $\frac{3}{4}$ are worth at 2 li. the yard, and you shall find that they are worth 31 li. 10 s. But they did cost 32 li. 13 s. 4 d. so that there is lost upon the whole, 1 li. 3 s. 4 d. Then to know how much is lost in the li. say by the rule of three, if 32 li. $\frac{2}{4}$ do lose 1 li $\frac{1}{3}$, what will $\frac{1}{1}$ lose? that is to say, what will 1 pound lose? reduce the whole numbers into their broken and

and then multiply 1 and divide, so shall you find $\frac{21}{588}$ parts of a li. Then multiply 21 by 240 d. because so many pence are in a li. and divide the product by 588, and you shall find 8 d. $\frac{336}{588}$. which being abrevied, doe make $\frac{4}{7}$ and thus you see, that 8 d. $\frac{4}{7}$, is lost in the li. of money.

$$\frac{98}{32\frac{2}{3}} \times \frac{7}{1\frac{1}{6}} \quad \frac{1}{1}.$$

8. If 1 yard of cloth of tissue, be sold for 3 li. 15 s. whereupon is lost after the rate of 10 d. in the 100: I demaund what 12 yards $\frac{1}{2}$ of the same tissue did cost? Answ. Adde unto 3 li. 15 s. his owne $\frac{1}{10}$ part, which is 7 s. 6 d. and all amounteth to 4 li. 2 s. 6 d. then looke what the 12 yards $\frac{1}{2}$, will amount unto, after 4 li. 2 s. 6 d. & you shal find that they will come to 51 li. 11 s. 3 d. so much did the 12 yardes $\frac{1}{2}$ cost.

3 *li.* 15 *sh.* 0 *d.*	12	$\frac{1}{2}$.	
7 6	4 *li.*	2 *shi.*	6 *d.*
4 *li.* 2 *sh.* 6 *d.*	48	00	0
	1	10	0
	2	01	3
	51 *li.*	11 *shi.*	3 *d.*

9. More, if I sell one Wiltshire white for 6 li. 12 s. whereupon I doe againe after the rate of 2 s. upon the li. of money:

that is to say, upon 20 s. I demaund what 11 peeces of the same whites did cost me? Answ. From 6 li. 12 s. (which is 132 s.) you shall substract his $\frac{1}{11}$ part that is to say, 12 s. and there will remaine 120 s. or 6. li. Then see at 6 li. the cloth, what the 11 clothes are worth, and you shal find that they are worth 66 li. And so much did the 11 clothes cost.

132 shil.	11
12 shil.	6
120 shil.	66 li.

10 If I sell 10 elles $\frac{1}{2}$ of Holland for 22 s. 9 d. whereupon I doe lose after the rate of 2 s. in the li. of money, I demaund what the ell did cost me? Answ. Say by the rule of three, if 18 give 20 s. what will 22 s. 6 d. give? Multiply & divide, and you shall find 25 s. Then divide 25 s. by 10 $\frac{1}{2}$: and thereof commeth 2 s. 4 d. $\frac{4}{7}$. So much did the ell cost.

$\frac{18}{1} X \frac{20}{1}$. $22\frac{1}{2}$.

11 If I sell one cloth for 5 li. whereupon I doe lose after 10. in the 100. I demaund how much I should lose or gain, in the 100, if in case I had sold the same for 5 li. 10 s. Answer. Say if 90 yeeld 100 how much will 5 pound give? Multiply and divide and you shall find 5 pound.

The

Then say againe by the rule of three, if $5\frac{5}{9}$ come to $5\frac{1}{2}$, what will 100 come to? Multiply and divide and you shall find 99 li. which being substracted from a 100, there will remaine 1 li. and so much is lost in the 100.

Chap. 5.

Of lengths and breadthes of Tapestry, and other clothes.

1 IF a piece of Tapestry be 5 elles $\frac{3}{4}$ long, and 4 elles $\frac{3}{5}$ in breadth, how many elles square doth the same peece containe? Answ. Multiply the length by the bredth, that is to say $5\frac{3}{4}$ by $4\frac{3}{5}$, and thereof will come 26 elles $\frac{2}{5}$, so many elles square doth the same peece containe.

2 More, if a peece of tapestry doe contain 32 elles square, and the same being in length, 6 elles $\frac{1}{4}$. I demaund how many elles in breadth the same peece doth containe? Answ. Divide 32 elles by $6\frac{1}{4}$, and thereof commeth $5\frac{3}{25}$. So many elles doth the same peece containe in breadth.

3 More, a peece of cloth being 13 yards $\frac{1}{3}$ in length, and 5 quarters $\frac{1}{2}$ a quarter in breadth, how many yards of $\frac{2}{3}$ and $\frac{1}{2}$ of one third broad, will the same peece make? Ans. See first by the 5 Reduction what part of a yard the $\frac{5}{4}$ and $\frac{1}{2}$ quarter be, and you shall

sed to be semblable or like to the third in quality or name.

When one Merchant selleth wares to another, and he giveth to the buyer 2 upon 15: how much shall the buyer gaine upon the 100, after the rate?

Answ. First adde 2 unto 15, and they are 17, then say if 15 give 17, what shall 100 give? Multiply and divide and you shall find 113 $\frac{1}{3}$, so the buyer getteth after the rate of 13 $\frac{1}{3}$ upon the 100.

15: | 17: | 100.

4 If one Northern dozen cost me 3 l. 5 s. I sell the same again for 3 li. 12 s. 6 d. how much doe I gain upon the pound of mony after the rate? Answer. Say if 3 li. $\frac{1}{4}$ doe give 3 li. $\frac{5}{8}$ what shall $\frac{20}{1}$ give? put the whole number into their broken and you shall have $\frac{13}{4}$ X $\frac{29}{8}$ $\frac{20}{1}$, then multiply 4 times 29, by 20: and thereof cometh 2320: for your number that is to be divided: likewise multiply 13 times 8, 1 time, and thereof cometh 104. Then divide 2320, by 104 and you shall find 22 shillings, $\frac{4}{13}$. So I shall get 2 s. $\frac{4}{13}$ upon 20 s. or upon the pound of mony.

$$\frac{13}{3\frac{1}{4}} \times \frac{29}{3\frac{5}{8}} \quad \frac{20}{1}.$$

5 If

5 If a yard of cloth cost me 7 s. 8 d. and afterward I sell of the same cloth 13 yards $\frac{1}{2}$ for 4 li. 13 s. 4 d. I would know whether I doe win or lose, and how much upon the 100 li. of mony? Answer. See first at 7 s. 8 d. the yard what the 13 yards $\frac{1}{2}$ shall cost, and you shall find 5 li. 1 s. 7 d. And I sold the same but for 4 li. 13 s. 4 d. so that I doe lose upon the 13 yards $\frac{1}{2}$, the sum of 8 s. 3 d. Then if you wil know how much is lost in the 100: Say by the rule of three, if 5 li. 1 s. 7 d. doe lose 8 s. 3 d. what will 100 li. lose? First, put 1 s. 7 d. into the part of a li. and it will be $\frac{19}{240}$. Likewise put 8 s. 3 d. into the part of a li. and it is $\frac{33}{80}$. Then will your numbers stand thus: 5 $\frac{19}{240}$ X $\frac{33}{80}$ $\frac{100}{1}$, reduce the whole into his broken, and then multiply and divide, so you shall find 8 li. $\frac{5184}{5752}$, which fraction is worth 2 s. 5 d. $\frac{169}{1219}$, and so much is lost in the 100 li. of mony.

$$\begin{array}{l} 1219 \\ \overline{5}\ \ \frac{19}{240}\ \mathrm{X}\ \overline{\frac{33}{80}\ \frac{100}{1}} \end{array}$$

6 More, If 12 yards $\frac{1}{2}$ of scarlet, be sold for 30 li. 15 s. upon the which is gained after the rate of 11 $\frac{1}{9}$ upon the 100: I demand what the yard did cost at the first? Ans. from 30 li. 15 s. substract his $\frac{1}{10}$ part which is 3 li. 1 s. 6 d. and there resteth 27 li. 13 s.

s. 6 d. the which number multiplyed by 2 bringeth 55 li. 7 s. of the which number take the $\frac{1}{5}$, which is 11 li. 1 s. and 4 d. & $\frac{4}{5}$. Then take again the $\frac{1}{5}$ of the said 11 pound, 1 shilling 4 d. $\frac{4}{5}$, which is 2 li. 4 shillings 3 pence, $\frac{9}{25}$. And so much did the yard cost at the first penny.

30 *lib.*	15 *shil.*	0 *d.*
3	1	6
27	13	6
2	0	0
55	7	0
11	1	$4\frac{4}{5}$.
2 *lib.*	4 *shil.*	3 *d.* $\frac{9}{25}$

7 More, if 15 yards $\frac{3}{4}$ of scarlet, doe cost me 32 li. 13 s. 4 d. And I sell the yard again for 2 li. whether doe I winne or lose, & how much in or upon the pound of mony?

Answer. Look what the 15 yards, $\frac{3}{4}$ are worth at 2 li. the yard, and you shall find that they are worth 31 li. 10 s. But they did cost 32 li. 13 s. 4 d. so that there is lost upon the whole, 1 li. 3 s. 4 d. Then to know how much is lost in the li. say by the rule of three, if 32 li. $\frac{2}{4}$ do lose 1 li $\frac{1}{3}$, what will $\frac{1}{1}$ lose? that is to say, what will 1 pound lose? reduce the whole numbers into their broken and

and then multiply 1 and divide, ſo ſhall you find $\frac{21}{588}$ parts of a li. Then multiply 21 by 240 d. becauſe ſo many pence are in a li. and divide the product by 588, and you ſhall find 8 d. $\frac{336}{588}$. which being abreviſed, doe make $\frac{4}{7}$ and thus you ſee, that 8 d. $\frac{4}{7}$, is loſt in the li. of money.

$$\frac{98}{3\,2\frac{2}{3}\,\mathrm{X}\,1\frac{1}{8}} \qquad \frac{7}{\frac{1}{7}}$$

8. If 1 yard of cloth of tiſſue, be ſold for 3 li. 15 s. whereupon is loſt after the rate of 10 d. in the 100: I demaund what 12 yards ½ of the ſame tiſſue did coſt? Anſw. Adde unto 3 li. 15 s. his owne $\frac{1}{10}$ part, which is 7 s. 6 d. and all amounteth to 4 li. 2 s. 6 d. then looke what the 12 yards ½, will amount unto, after 4 li. 2 s. 6 d. & you ſhal find that they will come to 51 li. 11 s. 3 d. ſo much did the 12 yardes ½ coſt.

			12	½.	
3 *li.*	15 *ſh.*	0 *d.*	4 *li.*	2 *ſhi.*	6 *d.*
	7	6	48	00	0
4 *li.*	2 *ſh.*	6 *d.*	1	10	0
			2	01	3
			51 *li.*	11 *ſhi.*	3 *d.*

9. More, if I ſell one Wiltſhire white for 6 li. 12 s. whereupon I doe againe after the rate of 2 s. upon the li. of money:

that is to ſay, upon 20 s. I demaund what 11 peeces of the ſame whites did coſt me? Anſw. From 6 li. 12 s. (which is 132 s.) you ſhall ſubſtract his $\frac{1}{11}$ part that is to ſay, 12 s. and there will remaine 120 s. or 6 li. Then ſee at 6 li. the cloth, what the 11 clothes are worth, and you ſhal find that they are worth 66 li. And ſo much did the 11 clothes coſt.

132 ſhil.	11
12 ſhil.	6
120 ſhil.	66 li.

10 If I ſell 10 elles $\frac{1}{2}$ of Holland for 22 s. 9 d. whereupon I doe loſe after the rate of 2 s. in the li. of money, I demaund what the ell did coſt me? Anſw. Say by the rule of three, if 18 give 20 s. what will 22 s. 6 d. give? Multiply & divide, and you ſhall find 25 s. Then divide 25 s, by 10 $\frac{1}{2}$: and thereof commeth 2 s. 4 d. $\frac{4}{7}$. So much did the ell coſt.

$\frac{18}{1}$ X $\frac{20}{1}$. 22 $\frac{1}{2}$.

11 If I ſell one cloth for 5 li. whereupon I doe loſe after 10. in the 100. I demaund how much I ſhould loſe or gain, in the 100, if in caſe I had ſold the ſame for 5 li. 10 s. Anſwer. Say if 90 yeeld 100, how much will 5 pound give? Multiply and divide and you ſhall find 5 pound. $\frac{5}{9}$

Then

Then say againe by the rule of three, if $5\frac{5}{9}$ come to $5\frac{1}{2}$, what will 100 come to? Multiply and divide and you shall find 99 li. which being substracted from a 100, there will remaine 1 li. and so much is lost in the 100.

Chap. 5.
Of lengths and breadthes of Tapestry, and other clothes.

1 IF a piece of Tapestry be 5 elles $\frac{3}{4}$ long, and 4 elles $\frac{2}{3}$ in breadth, how many elles square doth the same peece containe? Answ. Multiply the length by the bredth, that is to say $5\frac{3}{4}$ by $4\frac{2}{3}$, and thereof will come 26 elles $\frac{5}{6}$, so many elles square doth the same peece containe.

2 More, if a peece of tapestry doe contain 32 elles square, and the same being in length, 6 elles $\frac{1}{4}$. I demaund how many elles in breadth the same peece doth containe? Answ. Divide 32 elles by $6\frac{1}{4}$, and thereof commeth $5\frac{3}{25}$. So many elles doth the same peece containe in breadth.

3 More, a peece of cloth being 13 yards $\frac{1}{3}$ in length, and 5 quarters $\frac{1}{2}$ a quarter in breadth, how many yards of $\frac{2}{3}$ and $\frac{1}{2}$ of one third broad, will the same peece make? Ans. See first by the 5 Reduction what part of a yard the $\frac{5}{4}$ and $\frac{1}{8}$ quarter be, and you shall

find that they make $\frac{11}{8}$, which is one yard $\frac{3}{8}$. Then multiply 13 yardes $\frac{1}{3}$ by 1 yard $\frac{3}{8}$, and you shall have 18 yards $\frac{1}{3}$ in square, the which you must divide by $\frac{2}{3}$ and $\frac{1}{2}$ being reduced into one fraction by the fift Reduction: that is to say, by $\frac{5}{6}$ (because the $\frac{2}{3}$ and $\frac{1}{2}$ being brought into one fraction maketh $\frac{5}{6}$) and you shall find 22 yards. So many yards of $\frac{2}{3}$ & $\frac{1}{2}$ broad doth the same piece containe.

4 More, a Merchant bought 4 yards $\frac{2}{3}$ of cloth, being six quarters and halfe one quarter broad, to make him a gowne, the which he will line through out with black Say of $\frac{3}{4}$ of a yard broad. I demaund how much Say ye must buy? Ans. Multiply the length of the cloth by the breadth, that is to say, 4 $\frac{2}{3}$ by 1 $\frac{5}{8}$ (which is the six quarters $\frac{1}{2}$ a quarter) and thereof commeth 7 yards $\frac{7}{12}$, the which divide by $\frac{3}{4}$, and you shall find 10 yards $\frac{1}{9}$. So many yards of Say must he have to line the same 4 yards $\frac{2}{3}$ of cloth being of 6 quarters, and $\frac{1}{2}$ a quarter broad.

5 More, at 6 s. 8 d. the elle square what shall a peece of Tapestry cost me, which is 5 elles $\frac{1}{2}$ long, and 4 elles $\frac{1}{4}$ broad? Answ. Multiply 5 $\frac{1}{2}$ by 4 $\frac{1}{4}$, and thereof commeth 23 elles $\frac{3}{8}$ square: then say by the rule of three, if 1 elle square cost me 6 s. 8 d. what shall 23 $\frac{3}{8}$ elles cost? Multiply and divide, and you shall finde 7 li. 15 s. 10 d. so much the said

said peece of Tapestry did cost.

Or otherwise by the Rules of practise, take the $\frac{1}{3}$ of 23 $\frac{3}{8}$: and you shall finde 7 li. 15 s. 10 d. as above is said.

6 More, a peece of Holland cloth containing 42 ells $\frac{2}{3}$ Flemish, how many ells English doe they make? Here you must first note, that 100 elles Flemmish, doe make but 60 elles English, and so consequently, 5 ells Flemmish, doe make but 3 ells English. Therefore say by the rule of Three, if 5 ells Flemmish doe make 3 elles English, how many English will 42 elles $\frac{2}{3}$ Flemmish make? Multiply and divide, and you shall find 25 ells $\frac{3}{5}$ English, and so many ells English doth 42 ells $\frac{2}{3}$ Flemmish containe: the like is to be done of all others.

7 More, I have bought a peece of Tapestry being 5 elles $\frac{3}{4}$ long, and 4 elles $\frac{2}{3}$ broad of Flanders measure, I demaund how many elles square it maketh English measure? Answ. First, forasmuch as 3 elles English are worth 5 elles Flemmish, therefore put 3 elles English into his square, in multiplying 3 by it selfe which maketh 9: likewise multiply 5 in it selfe squarely, and it will be 25. Then multiply 5 $\frac{3}{4}$, which is the length of the peece by 4 $\frac{2}{3}$, which is the breadth, and thereof commeth 26 elles $\frac{5}{6}$ square, then say by the rule of three, if 25 ells

square of Flemmish measure be worth 9 elles square of English measure, what are 26 elles $\frac{5}{8}$ Flemmish worth? Multiply and divide and you shall find that they are worth 9 elles $\frac{33}{50}$ square of English measure.

8 More, at 3 s. 6 d. the elle Flemmish, what is the English elle worth after the rate? Answ. First, say if 5 elles Flemmish be worth 3 elles English, what is 1 elle Flemmish worth? multiply and divide and you shall finde $\frac{3}{5}$ of an English elle. Then say againe by the rule of Three, if $\frac{3}{5}$ of an English elle, be worth 3 s. 6 d. what is 1 English ell worth? multiply and divide, and you shall find 5 s. 10 d. so much shall the English ell be worth.

9 More, at 6 s. 8 d. the Flemmish elle square, what is the English ell worth? Ans. Say by the aforesaid reason, if 25 elles Flemmish square, be worth 9 elles square English, what is 1 elle square Flemmish worth? Multiply and divide, and you shall find $\frac{9}{25}$ of a square English elle. Then say, if $\frac{9}{25}$ of an English elle be worth 6 s. 8 d. what is 1 square English ell worth? multiply and divide, and you shall find 18 s. 6 d. $\frac{2}{9}$, so much shall one English elle square be worth.

Chap. 6.
Of the reducing of the Pawnes of Genes into English yards.

Note that 100 pawnes doe make 26 yards and 1 pawn is $\frac{13}{50}$ of a yard after the sam(e) rate, and 3 pawnes $\frac{11}{13}$ doe make 1 yard.

Example.

1 I Have bought 97 Pawnes $\frac{1}{2}$ of Genes velvet, and I would know how many yardes they will make? Answ. Say by the rule of three, if 100 pawnes doe make 26 yards, what will 97 $\frac{1}{2}$ make? Multiply and divide, and you shall have 25 yards $\frac{7}{25}$. So many yards doe the 97 pawnes $\frac{1}{2}$ containe.

Or otherwise, take some other number at your pleasure, as 25 pawnes which doe make 6 yards $\frac{1}{2}$, and then say by the rule of three, if 25 pawnes doe make 6 yards $\frac{1}{2}$, what will 97 $\frac{1}{2}$ Pawnes make? Multiply and divide, and you shall find 25 yards $\frac{7}{25}$ as before.

More, at 2 s. 7 d. the pawne of Genes, what will the English yard be worth after the rate? Answ. Say by the rule of three, if $\frac{13}{50}$ of an English yard be worth 2 shil. $\frac{7}{12}$. What is $\frac{1}{1}$ yard worth? Multiply and divide, and you shall find 9 s. 11 d. $\frac{3}{13}$. So

much is the English yard worth. Or otherwiſe multiply 100 pawnes which is 26 yards by 2 s. 7 d. and thereof commeth 258 s. 4 d. the which you muſt divide by 26 yards, and you ſhall find 9 s. 11 d. $\frac{3}{13}$, as before.

3 If 257 Pawnes $\frac{1}{2}$ be worth 20 li. 16 s. 8 d. What is 1 yard worth after the rate? Anſwer. Say by the rule of three, if 257 $\frac{1}{2}$ pawnes be worth 20 $\frac{5}{6}$, what are 3 pawnes $\frac{11}{13}$ worth? Multiply and divide, and you ſhall finde $\frac{1250}{40170}$ part of a pound, which is worth 6 s. 2 d. $\frac{324}{1339}$, and ſo much is 1 yard worth.

Chap. 7.
Of Merchandize ſold *by weight.*

1. At 9 d. $\frac{1}{2}$ the ounce, what is the li. waight worth? Anſw. Say if $\frac{1}{1}$ give 9 $\frac{1}{2}$, what will $\frac{16}{1}$ give? Multiply and divide, and you ſhall find 12 s. 8 d. ſo much is the yard worth?

Or otherwiſe, by the rules of practiſe, for 6 pence take the $\frac{1}{2}$ of 16, which is 8 s. then for 3 d. take the $\frac{1}{4}$ of 16 s. which is 4 s. Finally, for the halfe pence, take 16 ob. which are 8 d. then adde all theſe numbers together and you ſhall finde 12 s. 8 d. as before.

3 More, at 10 $\frac{1}{2}$, the ounce: what are

112 li.

112 li. weight worth after the rate? Answ. Reduce 112 li. into ounces. in multiplying 112 li. by 16 ounces, and you shall have 1792 ounces: then say by the Rule of three, if $\frac{1}{1}$ X 10 $\frac{1}{2}$. $\frac{1792}{1}$ Multiply and divide, and you shall find 18816 d. which do make 78 li. 8 s. and so much are the 112 li. worth after 10 d. $\frac{1}{2}$ the ounce.

4. At 12 s. 8 d. the li. weight, what is the ounce worth? Answ. Put 12 s. 8 d. into pence, and you shall have 152 pence: then say by the rule of three, if 16 ounces cost 152 pence, what shall 1 ounce cost? multiply and divide, and you shall find 9 pence $\frac{1}{2}$ so much is the ounce worth.

Or otherwise, take the $\frac{1}{4}$ of 12 s. 8 d. for 4 ounces, and thereof commeth 3 s. 2 d. then for one ounce, take the $\frac{1}{4}$ of 3 s. 2 d. and you shall have 9 d. $\frac{1}{2}$ as before.

5 At 32 li. 10 s. the quintal, that is to say, the 100 li. weight: what is 1 li. weight worth after the same rate? Answ. Put 32 li. 10 s. all into shil. and you shall have 650 s.

Then say by the rule of three, if 100 give 650, what will 1 give? Multiply and divide, and you shall find 6 s. 6 d. so much is the li. worth.

6 If one pound of Saffron doe cost me 18 s. 8 d. what shall 355 li. 10 ounces cost me

me by the ſame price? Anſw. Say by the rule of three, if $\frac{1}{1}$ X 18 $\frac{2}{3}$. 355 $\frac{5}{8}$. Multiply and divide, and you ſhall find 331 li. 18 s. 4 d. ſo much are the 355 li. 10 ounces worth.

Briefe Rules of waight.

Who that multiplieth the pence that 1 pound weight is worth, by 5, and divideth the product thereof by 12, he ſhall find how many pounds in money the quintall is worth, that is to ſay, how much the 100 pound weight is worth.

And contrariwiſe he that multiplieth the pounds of money that the 100 li. weight is worth by 12, and divideth the product by 5, ſhall find how many pence the Pound weight is worth.

Example.

At 17 pence the pound weight what is the 100 pound weight worth?

Anſw. Multiply 17 by 5, and thereof commeth 85, divide the ſame by 12, and you ſhall find 7 pound $\frac{1}{12}$ in money, which $\frac{1}{12}$ is worth one ſhilling and eight pence. So much is 100 li. weight worth.

More, at 13 li. the 100 li. weight, what is one pound weight worth?

Anſw. Multiply 13 by 12 and thereof com-

commeth 156: the which divide by 5, and you shall find 31 d. $\frac{1}{5}$, which is 2 s. 7 d. $\frac{1}{5}$, and so much is one li. weight worth.

The like is to be done of yards, elles or of any other measure, when we reckon but 5 score to the hundred.

Briefe Rules for Measure.

Who that multiplieth the pence that one elle is worth, by 2. and divideth the product by 4, he shall find how many pounds in money the 120 elles are worth, which 120 ells we count but for a Hundred in this place, because of worke, which measure is used for Canvas onely.

Or otherwise, if you divide the pence, that one elle is worth, by 2: you shall have in your quotient the pounds that the said 120 elles are worth, and if any thing remaine, they are parts of a pound.

And contrariwise, he that multiplieth the pounds in money that the 120 ells are worth, by 4, and divideth the of-come by 2, shall find how many pence the elle is worth.

Or otherwise, if you multiply the pounds that 120 elles are worth, by 2, you shall find in the product how many pence one elle is worth.

Exam-

Example.

At 10 pence the elle, what are 120 elles worth? Answ. Multiply 10 d. by 2, and thereof commeth 20. The which divide by 4. and you shall find 5 pound, so many pounds in money are 120 elles worth, at 10 d. the elle.

Or otherwise, divide 10 pence by 2, and thereof commeth into your quotient 5: which 5 doth represent 5 li. and so many pounds are the 120 ells worth, as before.

More, at 9 pound the 120 elles, what is one elle worth? Answ. Multiply 9 li. by 4, and thereof commeth 36, the which divide by 2, and you shall find 18 d. so much is one elle worth.

Or otherwise, if you multiply 9 pounds, which is the price that the 120 elles are worth by 2, you shall have in the product 18, which 18 doth signifie the pence that 1 elle is worth when the 120 elles doe cost 9 pound as before.

The like is to be done of all manner of wares, which are sold after 120 for the Hundred.

Briefe Rules of our Hundreth waight here at *London*, which *is after* 112 *lib. for the C.*

VVHo that multiplieth the d. that 1 l. waight is worth by 7, & divideth the product by 15 ſhal find how many pounds in money the 112 li. waight is worth.

And contrariwiſe, he that multiplieth the pounds in money, that 112 li. is worth by 15, & divideth the product by 7, ſhall find how many pence one li. waight is worth.

Example.

At *9* pence the pound weight, what is the 112 li. waight worth? Anſw. Multiply *9* d. by 7, and thereof commeth *63*, the which divide by 15 and you ſhall find 4 li. $\frac{3}{15}$, which being abbreviated is $\frac{1}{5}$ of a pound, being worth 4 s. And thus the 112 li. is worth 4 pounds, 4 ſhillings, after the rate of *9* d. the li.

At 8 li. the 112 li. waight, what is 1 li. waight worth? Anſw. Multiply 8 li. by 15, and thereof commeth 120, the which divide by 7 and you ſhall find 17 d. $\frac{1}{7}$, ſo much is 1 li. waight worth when the 112 li. is worth 8 pounds.

Chap.

Chap. 8.
Of Tares and allowances of Marchandize *sold by weight.*

AT 12 li. the 100 ſuttell, what ſhall 987 li. ſuttell be worth? In giving 4 pound waight upon every 100 for tret? Anſ. Add 4 li. unto 100 & you ſhall have 104. Then ſay by the Rule of three, if 104. be worth 12 li. what are 987 pound waight worth? Multiply and divide and you ſhal find 113 li. $\frac{23}{28}$ which is worth 17 s. 8 d. $\frac{4}{13}$. So much ſhall the 987 li. waight be worth.

104. | 12. | 987.

2 At 6 s. 8 d. the pound waight, what ſhall 345 li. $\frac{1}{2}$, be worth in giving 4 li. waight upon every 100 for the tret? Anſwer. See firſt by the rule of three, what the 100 pound is worth ſaying, If $\frac{1}{1}$ X 6 $\frac{2}{3}$. $\frac{100}{1}$. Multiply and divide, and you ſhall find 33 l. $\frac{1}{3}$, then adde 4 li. unto 100 and they are 104 then ſay againe by the rule of three, if 104 li. bee ſold for 33 li. $\frac{1}{3}$, for how much ſhall 345 li. $\frac{1}{2}$ be ſold? Multiply and divide, and you ſhall find 110 li. 14 s. 8 d. $\frac{11}{83}$. For ſo much ſhall the 345 $\frac{1}{2}$ be ſold, at 6 s. 8 d. the

pound

pound in giving 4 upon the 100.

3 More, if 100 li. be worth 36 s. 8 d. what shall 780 li. be worth, in rebating 4 li. upon every 100, for tare and closse. Answ. multiply 780 by 4, and thereof commeth 3120. The which divide by 100, & you shall have 31 li. $\frac{1}{5}$: abate 31 $\frac{1}{5}$ from 780 and there will remain 748 $\frac{4}{5}$. Then say by the rule of three, if $\frac{100}{1}$ doe cost 36 $\frac{2}{3}$. what will 748 $\frac{4}{5}$ cost after the rate? Multiply and divide, so shall you find 274 s. 6 d. $\frac{18}{135}$, and so much shall the 780 li. cost, in rebating 4 li. upon every 100, for Tare and Closse.

4 More, whether he doth lose more that giveth 5 li. upon the 100, or he that rebateth 5 li. in the 100 for tare and closse? Answer. First note, that he which giveth 5 li. upon the 100, giveth 105 for 100: and he which rebateth 5 li. in the 100, giveth the 100 for 95. Therefore, say by the Rule of three, if 105 be given for 100, for how much shall the 100 be given? Multiply and divide, and you shall find 95 $\frac{5}{21}$, and he which rebateth 5 in the 100 maketh but 95 of a 100: so that he loseth 5 in the 100, and the other which giveth 5 upon the 100, loseth but 4 $\frac{16}{21}$, upon the 100. Thus you may see that he which rebateth 5 in the 100 loseth more by $\frac{5}{21}$ in the 100, then the other which gave

5

5 upon the 100 for Tare and Cloſſe.

5 If 100 li. of Allom doe coſt me 26 s. 8 pence, how ſhall I ſell the pound waight to gaine after the rate of 10 upon the 100? Anſwer. Put 26 ſhillings 8 pence all into pence, and you ſhall have 320 pence. Then ſay by the rule of three, if 100 give 110, what ſhall 320 give? Multiply 320 by 110 and divide the product by 100, and you ſhall find 352 pence. Then ſay againe, if 100 pound be worth 352 pence, what is 1 pound worth? Multiply and divide, and you ſhall have 3 d. $\frac{26}{50}$: which $\frac{26}{50}$ is worth $\frac{1}{2}$, and $\frac{1}{25}$ of $\frac{1}{2}$. That is to ſay, the pound waight ſhal be worth 3 d. $\frac{1}{2}$, $\frac{1}{25}$ of a halfe penny, in gaining 10 upon the 100.

6 If one pound waight doe coſt me 6 s. 10 d. and I ſell the ſame for 7 s. 2 d. I demaund how much I ſhall gaine upon the 100 li. of money after the rate? Anſw. Say by the rule of three if 6 $\frac{5}{6}$ yeeld 7 $\frac{1}{6}$: what will $\frac{100}{1}$ yeeld? Put the whole numbers into their broken, then multiply and divide, & you ſhall find 104 $\frac{36}{41}$, from the which ſubſtract 100, and there reſteth 4 li. $\frac{36}{41}$ ſo much is gained upon the 100 pound of money after the rate.

7 More, If one pound doe coſt me 5 s. 4 d. & I ſell the ſame againe for 4 s. 9 d. I demaund

demand how much I ſhall loſe upon the 100 pound of mony? Anſwer. Say, if 5 $\frac{1}{3}$, doe give but 4 $\frac{3}{4}$ what ſhall $\frac{100}{1}$ give? Put the whole number into their broken, then multiply and divide, and you ſhall find 89 $\frac{1}{17}$, the which you muſt ſubſtract from a 100, and there will remaine 10 li. $\frac{13}{17}$, ſo much is loſt upon the 100 li. of mony.

8 More, if the li. waight doe coſt me 3 s. 2 d. and I ſell it againe for 4 s. 4 d. how much ſhall I gain upon 20 s? Anſw. Say if 3 $\frac{1}{6}$ give 4 $\frac{1}{3}$, what ſhall $\frac{20}{1}$ give? Multiply and divide, and you ſhall find 27 s. $\frac{7}{19}$ from the which abate 20 s. and there will remain 7 s. $\frac{7}{19}$ which is 4 d. $\frac{8}{19}$, and ſo much is gained upon the pound of mony, that is to ſay, upon 20 s.

9 If the pound waight doe coſt me 4 s. 4 d. and I ſell it again for 3 s. 2 d. I demand how much I ſhall loſe in the pound of mony? that is to ſay in twenty ſhillings. Anſwer. Say if 4 $\frac{1}{3}$ give but 3 $\frac{1}{6}$, what will $\frac{20}{1}$ give? Multiply and divide, and you ſhall find 14 s. $\frac{8}{13}$, the which you muſt abate from 20 s. and there will remain 5 s. $\frac{5}{13}$, which $\frac{5}{13}$ is worth 4 d. $\frac{8}{13}$ of a penny, and ſo much is loſt upon the pound of mony.

Chap. 9.

Of certain queſtions, done by the double Rule, and alſo by the Rule of three compoſed.

10. A Merchant hath ſold wines for the ſum of 300 pounds, and hee hath gained therein after 10 li. upon the 100 li. The queſtion is to know, how much hee gained in all? Anſwer. Say by the rule of three, if a 110 li. doe gain 10 li. what will 300 li. gain? Multiply and divide, and you ſhall find 27 li $\frac{5}{11}$, and ſo much hath he gained in all.

11 A Merchant hath bought a peece of Hamſhire Carſey containing 18 yards for the price of 4 li. 10 s. The queſtion is to know, how many yards he ſhall ſell for 33 s. 4 d. to gaine 20 s. in the whole peece?

Anſwer. Adde 20 s. unto 4 li. 10 s, and they make 5 li. 10 s. Then ſay by the rule of three, if 5 li. [illegible] doe yeeld me 18 yards, what will 1 li $\frac{2}{3}$ yeeld? multiply and divide, and you ſhall find 5 yards $\frac{5}{11}$. And ſo many yards ſhall he ſell, to gain 20 s, in the whole peece.

12 A Merchant hath ſold Sugars for the ſumme of 600 li. ready mony, and hee hath

hath gained in the whole, the summe of 60 li. The question is, to know how much he hath gained upon the 100 li. Answer. First you must substract 60 li. from 600 li, and there will remain 540 li. Then say by the rule of three, if 540 li. doe gain 60 li, what will 100 li. gaine? Multiply and divide, and you shall find 11 li. $\frac{1}{9}$. And so much had he gained upon the 100 li.

13 More, if 1 li. waight of maces do cost me 5 s 10 d, and afterward I doe sell the same for 6 s. the li. to be paid for it at the end of three months: I demand how much I shall gain upon 100 li. in 12 months after the rate? *Answer.* Say by the first part of the rule of three composed: if 5 s. $\frac{5}{6}$ in $\frac{3}{1}$ months doe gain $\frac{1}{6}$ of a shilling, which is 2 d. what $\frac{100}{1}$ li, gain in $\frac{12}{1}$ months? multiply and divide and you shall find 11 li $\frac{3}{7}$. And so much shall I gaine in 12 months after the rate.

14 More, if 1 peece of Carsey doe cost me 36 s for what price may I sell the same to be paid for it at the end of 3 months, so that I may gain thereby after the rate of 10 li. upon the 100 li in 12 months? *Ans.* Say by the first part of the Rule of three composed, if 100 pounds in 12 months doe gain 10 li. what will 36 s. gaine in three

Chap. 8.
Of Tares and allowances of Marchandize sold by weight.

At 12 lt. the 100 suttell, what shall 987 lt. suttell be worth? In giving 4 pound waight upon every 100 for tret? Ans. Add 4 lt. unto 100 & you shall have 104. Then say by the Rule of three, if 104. be worth 12 lt. what are 987 pound waight worth? Multiply and divide and you shal find 113 lt. $\frac{23}{26}$ which is worth 17 s. 8 d. $\frac{4}{13}$. So much shall the 987 lt. waight be worth.

104. | 12. | 987.

2 At 6 s. 8 d. the pound waight, what shall 345 lt. $\frac{1}{2}$, be worth in giving 4 lt. waight upon every 100 for the tret? Answer. See first by the rule of three, what the 100 pound is worth saying, If $\frac{1}{1}$ X $6\frac{2}{3}$. $\frac{100}{1}$. Multiply and divide, and you shall find 33 l. $\frac{1}{3}$, then adde 4 lt. unto 100 and they are 104 then say againe by the rule of three, if 104 lt. bee sold for 33 lt. $\frac{1}{3}$, for how much shall 345 lt. $\frac{1}{2}$ be sold? Multiply and divide, and you shall find 110 lt. 14 s. 8 d. $\frac{11}{13}$. For so much shall the 345 $\frac{1}{2}$ be sold, at 6 s. 8 d. the

pound

Pound in giving 4 upon the 100.

3 More, if 100 li. be worth 36 s. 8 d. what ſhall 780 li. be worth, in rebating 4 li. upon every 100, for tare and cloffe. Anſw. multiply 780 by 4, and thereof commeth 3120. The which divide by 100, & you ſhall have 31 li. $\frac{1}{5}$: abate 31 $\frac{1}{5}$ from 780 and there will remain 748 $\frac{4}{5}$. Then ſay by the rule of three, if $\frac{100}{1}$ doe coſt 36 $\frac{2}{3}$, what will 748 $\frac{4}{5}$ coſt after the rate? Multiply and divide, ſo ſhall you find 274 s. 6 d. $\frac{18}{25}$, and ſo much ſhall the 780 li. coſt, in rebating 4 li. upon every 100, for Tare and Cloffe.

4 More, whether he doth loſe more that giveth 5 li. upon the 100, or he that rebateth 5 li. in the 100 for tare and cloffe? Anſwer. Firſt note, that he which giveth 5 li. upon the 100, giveth 105 for 100: and he which rebateth 5 li. in the 100, giveth the 100 for 95. Therefore, ſay by the Rule of three, if 105 be given for 100, for how much ſhall the 100 be given? Multiply and divide, and you ſhall find 95 $\frac{5}{21}$, and he which rebateth 5 in the 100 maketh but 95 of a 100: ſo that he loſeth 5 in the 100, and the other which giveth 5 upon the 100, loſeth but 4 $\frac{16}{21}$, upon the 100. Thus you may ſee that he which rebateth 5 in the 100 loſeth more by $\frac{5}{21}$ in the 100, then the other which gave

5 upon the 100 for Tare and Cloffe.

5 If 100 li. of Allom doe coſt me 26 s. 8 pence, how ſhall I ſell the pound waight to gaine after the rate of 10 upon the 100? Anſwer. Put 26 ſhillings 8 pence all into pence, and you ſhall have 320 pence. Then ſay by the rule of three, if 100 give 110, what ſhall 320 give? Multiply 320 by 110 and divide the product by 100, and you ſhall find 352 pence. Then ſay againe, if 100 pound be worth 352 pence, what is 1 pound worth? Multiply and divide, and you ſhall have 3 d. $\frac{26}{50}$: which $\frac{26}{50}$ is worth $\frac{1}{2}$, and $\frac{1}{25}$ of $\frac{1}{2}$. That is to ſay, the pound waight ſhal be worth 3 d. $\frac{1}{2}$, $\frac{1}{25}$ of a halfe penny, in gaining 10 upon the 100.

6 If one pound waight doe coſt me 6 s. 10 d. and I ſell the ſame for 7 s. 2 d. I demaund how much I ſhall gaine upon the 100 li. of money after the rate? Anſw. Say by the rule of three if 6 $\frac{5}{6}$ yeeld 7 $\frac{1}{6}$: what will $\frac{100}{1}$ yeeld? Put the whole numbers into their broken, then multiply and divide, & you ſhall find 104 $\frac{36}{41}$, from the which ſubſtract 100, and there reſteth 4 li. $\frac{36}{41}$ ſo much is gained upon the 100 pound of money after the rate.

7 More, If one pound doe coſt me 5 s. 4 d. & I ſell the ſame againe for 4 s. 9 d. I demaund

demand how much I ſhall loſe upon the 100 pound of mony? Anſwer. Say, if 5 $\frac{1}{3}$, doe give but 4 $\frac{3}{4}$ what ſhall $\frac{100}{1}$ give? Put the whole number into their broken, then multiply and divide, and you ſhall find 89 $\frac{1}{16}$, the which you muſt ſubſtract from a 100, and there will remaine 10 li. $\frac{15}{16}$, ſo much is loſt upon the 100 li. of mony.

8 More, if the li. waight doe coſt me 3 s. 2 d. and I ſell it againe for 4 s. 4 d. how much ſhall I gain upon 20 s? Anſw. Say if 3 $\frac{1}{6}$ give 4 $\frac{1}{3}$, what ſhall $\frac{20}{1}$ give? Multiply and divide, and you ſhall find 27 s. $\frac{7}{19}$, from the which abate 20 s. and there will remain 7 s. $\frac{7}{19}$ which is 4 d. $\frac{8}{19}$, and ſo much is gained upon the pound of mony, that is to ſay, upon 20 s.

9 If the pound waight doe coſt me 4 s. 4 d. and I ſell it again for 3 s. 2 d. I demand how much I ſhall loſe in the pound of mony? that is to ſay in twenty ſhillings. Anſwer. Say if 4 $\frac{1}{3}$ give but 3 $\frac{1}{6}$, what will $\frac{20}{1}$ give? Multiply and divide, and you ſhall find 14 s. $\frac{8}{13}$, the which you muſt abate from 20 s. and there will remain 5 s. $\frac{5}{13}$, which $\frac{5}{13}$ is worth 4 d. $\frac{8}{13}$ of a penny, and ſo much is loſt upon the pound of mony.

Chap. 9.

Of certain questions, done by th[e] double Rule, and also by the Rule of three composed.

10. A Merchant hath sold wines for th[e] sum of 300 pounds, and hee ha[th] gained therein after 10 li. upon the 100 li. The question is to know, how much he[e] gained in all? Answer. Say by the rule o[f] three, if a 110 li. doe gain 10 li. what wil[l] 300 li. gain? Multiply and divide, and yo[u] shall find 27 li $\frac{5}{11}$, and so much hath he gai-ned in all.

11 A Merchant hath bought a peece o[f] Hamshire Carsey containing 18 yards fo[r] the price of 4 li. 10 s. The question is t[o] know, how many yards he shall sell for 3[3] s. 4 d, to gaine 20 s. in the whole peece[.]

Answer. Adde 20 s. unto 4 li. 10 s, an[d] they make 5 li. 10 s. Then say by the ru[le] of three, if 5 li. $\frac{1}{2}$ doe yeeld me 18 yard[s] what will 1 li $\frac{2}{3}$ yeeld? multiply and divid[e] and you shall find 5 yards, $\frac{5}{11}$. And so man[y] yards shall he sell, to gain 20 s, in the whol[e] peece.

12 A Merchant hath sold Sugars fo[r] the summe of 600 li. ready mony, and he[e] hat[h]

hath gained in the whole, the summe of 60 li. The question is, to know how much he hath gained upon the 100 li. Answer. First you must substract 60 li. from 600 li, and there will remain 540 li. Then say by the rule of three, if 540 li. doe gain 60 li, what will 100 li. gaine? Multiply and divide, and you shall find 11 li. $\frac{1}{9}$. And so much had he gained upon the 100 li.

13 More, if 1 li. waight of maces do cost me 5 s 10 d, and afterward I doe sell the same for 6 s. the li. to be paid for it at the end of three months: I demand how much I shall gain upon 100 li. in 12 months after the rate? *Answer*. Say by the first part of the rule of three composed: if 5 s. $\frac{5}{6}$ in $\frac{3}{1}$ months doe gain $\frac{1}{6}$ of a shilling, which is 2 d. what $\frac{100}{1}$ li, gain in $\frac{12}{1}$ months? multiply and divide and you shall find 11 li $\frac{3}{7}$. And so much shall I gaine in 12 months after the rate.

14 More, if 1 peece of Carsey doe cost me 35 s. for what price may I sell the same to be paid for it at the end of 3 months, so that I may gain thereby after the rate of 10 li. upon the 100 li. in 12 months? *Ans.* Say by the first part of the Rule of three composed. if 100 pounds in 12 months doe gain 10 li. what will 36 s. gaine in three

months? Multiply and divide, and you shall find $\frac{1080}{1230}$ of a shil. the which being abbreviated, doth make $\frac{9}{10}$ of a s, which is worth 10 d, $\frac{4}{5}$. the same you must adde with 36 s. and then you shall have 36 s. 10 d. $\frac{4}{5}$. And for that price, I must sell the peece of Kersey for to gaine therein 10 li. upon the 100 li. in 12 months, and giving 3 months time for the payment.

15 More, if 6 yards of northern Carsey doe cost me 8 s. and I sell 4 yards of the same Carsey for 6 s. I demaand whether I gain or lose, and how much upon a 100 li. of mony? *Answer.* First you must seek what the 4 yards of Carsey did cost: saying by the rule of three, if 6 yards do cost 8 s, what will 4 yards cost? Multiply and divide, and you shall find 5 s. $\frac{1}{3}$. and so much did the said 4 yards cost, therefore abate the same 5 $\frac{1}{3}$ from 6 s. and there will remain $\frac{2}{3}$ of a shilling, which $\frac{2}{3}$ is gained in the same 4 yards of Carsey. Then say again by the rule of three, if 5 $\frac{1}{3}$, doe gain $\frac{2}{3}$: what will $\frac{100}{1}$ gaine? multiply and divide, and you shall find 12 and $\frac{8}{16}$, which $\frac{8}{16}$ being abbrevied is $\frac{1}{2}$. Therefore it appeareth that I shall gaine 12 li. $\frac{1}{2}$ upon the 100 li. in selling 4 yards of the said Carsey for 6 s.

16. More, a Merchant hath bought a peece,

peece of Damask which cost him 8 s. the yard ready mony, and he selleth the same again to another Merchant, for 10 s. the yard, but he giveth two dayes for the payment, that is to say, 2 months for one half, and 5 months for the other halfe. The question is to know, how much the said first Merchant doth gain upon 100 li. in 12 months after the rate aforesaid? *Answer*. You must adde the 2 months and the 5 months both together, and they make 7 months, whereof you must take the one halfe, which is $3\frac{1}{2}$ months. And at that time, the second Merchant ought to have payed the whole, at one entire payment, and therefore say by the first part of the Rule of three composed. If $\frac{8}{1}$. in $3\frac{1}{2}$ months, doe gain $\frac{2}{1}$ s. what will $\frac{100}{1}$ gain in $\frac{12}{1}$ months? Multiply and divide, and you shall find 85 li. $\frac{5}{7}$. And so much doth the first Merchant gain upon the 100 in 12 months.

17 A Merchant hath bought velvet at 13 s. 9 d. the yard ready mony, and he selleth the same for 14 s. 3 d. the yard, to bee paid $\frac{1}{3}$ part in ready mony, $\frac{1}{4}$ part at three months, and the rest which is $\frac{5}{12}$, is to bee paid to him at 5 months. The question is, to know how much the first Merchant doth gain upon the 100 li. in 12 months, after

 the

the same rate? *Answer.* See first at what time all the paiments ought to bee paid at once: and for to know the same, you must multiply every severall paiment, by the time it ought to be paid, and adde them together, then divide the product by the totall summe of all the payments being added together; And your quotient will shew at what time all the paiments ought to be paid at once, as in the former example, $\frac{1}{3}$ part in ready mony is not multiplyed by any time, because it is paid presently, then $\frac{1}{4}$ part being multiplied by 3 months maketh $\frac{3}{4}$ of a month, and the rest being $\frac{5}{6}$ multiplied by 5 months bringeth 2 $\frac{1}{12}$, then adde $\frac{3}{4}$ and 2 $\frac{1}{12}$ together, and they make 2 months $\frac{5}{6}$, the which is the just time that all the payments ought to be paid at once. And therefore say by the first part of the rule of three composed. If 13 $\frac{1}{2}$ in 2 months $\frac{5}{6}$ doe gain $\frac{3}{4}$ of a pound, what will 100 li. gaine in 12 months after the rate? Multiply and divide, and you shall find 23 li. $\frac{9}{17}$. And so much doth he gaine upon the 100 li. in 12 months.

18 A Merchant hath bought fustians which cost him 22 s. 6 d. the peece ready mony, and he will sell the same at 24 s. the peece. The question is to know what time

he

hee ought to give for the payment of the same, to the end he may gaine after 9 li. upon the 100 li. in 12 months. Answ. Say if 22 $\frac{1}{2}$ doe gain 1 $\frac{1}{2}$: what will $\frac{100}{1}$ gaine? Multiply and divide, and you shall find 6 $\frac{2}{3}$ of gain. Then say againe by the rule of three, if $\frac{9}{1}$ of gain doe require $\frac{12}{1}$ what will 6 $\frac{2}{3}$ of gaine require? Multiply and divide, and you shall find 8 $\frac{8}{9}$, which is 8 months and $\frac{8}{9}$. and so long time, ought he to give, to gain after the rate of 9 li. upon the 100 li. in 12 months.

19 A Merchant hath bought a peece of Satten being in length 20 yards which did cost him 12 pounds and 10 s. ready mony. I demand for what price he shall sell the yard, to be paid at the end of 2 months, so that he may gain after the rate of 10 li. upon the 100 li. in 12 months? Answ. See first what the yard did cost him at the first, saying by the rule of three, if 20 yards cost 12 li. 10 s. what will 1 yard cost? Multiply and divide, and you shall find 12 s. and 6 d. Then say again by the rule of Three, if 12 months doe give me 10 li. what will 2 months give? Multiply and divide, and you shall find 1 li. $\frac{2}{3}$. Adde therefore the said 1 $\frac{2}{3}$ unto 100 and they are 101 $\frac{2}{3}$. Say therefore once again by the rule of three,

if $\frac{100}{1}$ doe give me 101 $\frac{2}{3}$ what will 12 $\frac{1}{2}$ give? multiply and divide, and you shall find 12 s. and $\frac{17}{24}$ which is worth 8 d. $\frac{1}{2}$, and for 12 s. 8 d. $\frac{1}{2}$. must he sell the yard of Satten giving 2 months time for the payment to gain after the rate of 10 li. upon the 100 li. in 12 months.

20 More, if 1 li. waight of Cinamon do cost me 8 s. ready mony, for what price shall I sell 100 li. waight of the same, to be paid the $\frac{1}{4}$ at 1 month, and the residue at the end of 3 months; so that I may gaine after 9 li. upon the 100 li. in twelve moneths after the rate? Answer. Seek first in how long time, both the Paiments should bee made at once.

$\frac{1}{4}$. $\frac{1}{1}$. $\frac{1}{4}$.
$\frac{3}{4}$. $\frac{3}{1}$. 2 $\frac{2}{4}$.

2 $\frac{1}{2}$ *month.*

The which to doe, you must multiply each paiment of mony, by the time when it ought to be paid that is to say, you must multiply the first payment which is $\frac{1}{4}$ part by $\frac{1}{1}$ moneth, and thereof commeth $\frac{1}{4}$ of a moneth. Likewise you must multiply the next payment which is $\frac{3}{4}$ by 3 months, and thereof will come 2 months $\frac{1}{4}$. Then adde $\frac{1}{4}$ of a month, and 2 months $\frac{1}{4}$ both together, and they make two moneths $\frac{1}{2}$ which is the time that both the payments ought

to

to be paid at once. Then ſay by the rule of three, if 12 months do give 9 li. what will 2 months $\frac{1}{2}$ give? Multiply and divide, and you ſhall find 1 $\frac{7}{8}$. Say againe by the Rule of three. If 1 li. waight doe coſt me 8 s. what will 100 li. coſt? Multiply and divide, and you ſhall find 40 li. Then ſay once againe, if $\frac{100}{1}$ doe give 101 $\frac{7}{8}$, what will $\frac{40}{1}$ give? Multiply and divide, and you ſhall find 40 $\frac{3}{4}$. And for 40 li. 15 s. I muſt ſell 100 li. waight of Cinamon, to be paid at the 2 ſeverall times aforeſaid to gain therein after the rate of 9 li. upon the 100 li. in 12 months, as by example aforeſaid.

20 When the quarter of wheat doth coſt 6 s. 8 d. the loafe of bread weighing 20 ounces, is ſold for a halfe penny. I demand that if the quarter of wheat did coſt tenne ſhillings, for how much ſhall the loafe of bread be ſold, that weigheth 16 ounces? you ſhall anſwer by the firſt part of the Rule of Three compoſed, which is mentioned in the ſecond Chapter of the third part of this book, where you muſt ſay by the ſame firſt part of the rule of 3 compoſed, if $6\frac{2}{3} \mid \frac{10}{1} \backslash \frac{1}{2}$ $\frac{10}{1} \mid 16$.

Then multiply the firſt number by the ſecond, and the product thereof ſhall bee your diviſors. Likewiſe multiply the other three

three numbers the one by the other, and the product thereof shall be your dividend: as thus, first multiply $6\frac{2}{3}$ by $\frac{20}{1}$, and thereof cometh $\frac{400}{3}$ for your divisor, then multiply $\frac{1}{2}$ by $\frac{10}{1}$ and the product thereof by $\frac{16}{1}$, so you shall have $\frac{160}{2}$ for your number that is to be divided, then divide $\frac{160}{2}$ by $\frac{400}{3}$, and thereof cometh $\frac{480}{800}$, the which being abbrevied bringeth $\frac{3}{5}$ of a peny: and for that price must the loafe of bread be sold, which weigheth 16 ounces, when the quarter of wheat is worth 10 shillings.

Or otherwise by the Rule of three at two times. First say, if $\frac{10}{1}$ ounces give $\frac{1}{2}$, what will $\frac{16}{1}$ ounces give? multiply and divide, and you shall find $\frac{2}{5}$ of a peny. Then say again, if $6\frac{2}{3}$, doe give me $\frac{2}{5}$, what will $\frac{10}{1}$ give? Multiply and divide, and you shall find $\frac{3}{5}$ of a penny, as afore is said.

21 When the carriage of one hundred waight of merchandize 50 miles, doth cost 5 s. what shall the carriage of 500 waight cost me for 16 miles? Ans. By the first part of the rule of 3 composed, saying, if 100 50 5|500|16. Multiply 100 by 50, the product will be 5000, which shall be your divisor. Then multiply 5 times 500 by 16, and thereof cometh 40000 for your dividend. Therefore divide 40000 by 5000, and you shall

ſhall find 8 s. ſo much ſhall coſt the carri-age of 500 waight 16 miles.

Or otherwiſe by the double rule of three, that is to ſay, by the rule of three at two times: firſt ſay, if 50 miles do pay 5 s. what ſhall 16 miles pay? Multiply and di-vide, and you ſhall find 1 s. $\frac{3}{5}$. Then ſay again, if 100 waight doe coſt me 1 s. $\frac{3}{5}$, what ſhall 500 waight coſt? Multiply and divide, and you ſhall find 8 s. as before.

22 When the carriage of 100 pound waight of Merchandize 84 miles doth coſt me 6 s. how many miles may I have 64 pound waight carried for 3 s. 4 d? Anſwer, by the ſecond part of the Rule of Three compoſed, and ſay if $\frac{100}{1}$ | $\frac{84}{1}$ | $\frac{6}{1}$ | $\frac{64}{1}$ | $3\frac{1}{3}$.

Then multiply the fourth number $\frac{64}{1}$, by the third number $\frac{6}{1}$ and thereof cometh $\frac{384}{1}$ for your diviſor. Likewiſe multiply $3\frac{1}{3}$ by $\frac{100}{1}$, and by $\frac{84}{1}$, and you ſhall have in the product $\frac{84000}{3}$, then divide $\frac{84000}{3}$ by $\frac{384}{1}$, and you ſhall find 72 miles, and $\frac{11}{12}$ of a mile. So many miles ſhall the 64 li. waight be car-ried for 3 ſhillings 4 d.

Otherwiſe by the rule of three, at two times: Firſt, ſay if 100 waight doe coſt me 6 s., what will 94 li. waight coſt? Multi-ply and divide and you ſhall find 3 s. $\frac{21}{25}$. Then ſay if $3\frac{21}{25}$ bee paid for 94 miles carriage:

carriage: for how many miles shall 3 s. $\frac{1}{8}$ be paid? multiply and divide, and you shall find 72 miles $\frac{11}{12}$, as before.

23 If 100 horses, in 100 daies, doe spend 180 quarters of oats: how many quarters of oats will 350 horses spend in 150 daies? Answer. By the first part of the rule of three composed you must multiply 180 times 350, by 150: and divide the product by 100 times 100: and you shall find 945 quarters. So many quarters of oats will 350 horses spend, in 150 daies. Or otherwise by the rule of three at two times: First say, if 100 daies doe yeeld me 180 quarters of oats: what shall 150 daies yeeld? Multiplie and divide, and you shall find 270 quarters: then say againe, if 100 horses doe spend 270 quarters of oats, how many quarters of oats will 350 horses spend? Multiply and divide, and you shall find 945 quarters, as before.

Chap. 10.

Of the Rules of Fellowship, without any time limited.

THe Rule of fellowship is thus, you must set down each mans sum of money that he laieth into company, every one directly under the other, the which sums you shall add all together, & the total sum of al their whole stocks being thus assembled shall be your common divisor, to the finding out of every mans part of the gaine. Then you shall multiply either the gaine, or else the losse which soever of them doe happen by each mans portion of money that he laid in, and divide the products by the said divisor: so shall you have in your quotient every mans part of the gaine, if any thing be gained, or else of the losse if any thing be lost.

Example.

1 Two Merchants have laid their money in company together: The first laid in 500 li. The second laid in 300 li. and with trading they have gained 64 li. I demaund, how much each man shall have of the same gaines according to the money that he laid in? Answ. Adde 500 and 300 both together,

ther, which are the parcels or summes that they both laid in, and thereof commeth 800 for your divisor: then say by the rule of three, if 800 li. which is the whole stock doe gaine 64 li. what shall 500 li. gaine, (which is the first mans money that he laid in) multiply and divide & you shall find 40 li. for the first mans part of the gaine: then say, if 800 give 64, what will 300 give? Multiply and divide, and you shall finde 24 li. for the second mans part of the gaine.

500			
300	800	64	500.
800			
	800	64	300.

Or otherwise, put 500 li. which is the first mans money that he laid in, over the 800 li. which is the whole stock, and you shall have $\frac{500}{800}$, which being abbreviated, doe make $\frac{5}{8}$ and such part of the gaine shall the first man take, that is to say $\frac{5}{8}$ of 64 li. which is 40 li. And consequently, by the same manner, the second shall take the $\frac{3}{8}$ of 64, which is 24 pound, for his part of his gaine, as before.

5	00	3	00
8	00	8	00

2 Two Merchants have companied together, the first laid in 640 li. and he taketh $\frac{5}{8}$ parts of the gaine, I demaund how much the second Merchant laid in? Answ. Seeing that the first Merchant taketh $\frac{5}{8}$ of the gaine it followeth that the second merchant must have $\frac{3}{8}$, which is the rest, and therefore say by the rule of three, if $\frac{5}{8}$ of the gaine which the first man taketh, did lay into the stock $\frac{640}{1}$. How much shall $\frac{3}{8}$ of the gaine lay in, which is the second mans gaine? Multiply and divide, and you shall finde 384 li. so much ought the second man to lay into company.

3 Two Merchants have companied together, the first man layed in 640 li. and the second hath laid in so much money for his part, that he must have 60 li. for his part of 100 li. that they have gained. I demaund how much the second man did lay into company? Answ. Seeing that the second man taketh 60 li. of the gaine, it followeth that the first must have the rest of the 100 li. which is but 40 pound. Therefore say by the rule of Three, if 40 li. doe lay in 640 li. what shall 60 li. lay in? Multiply and divide

vide and you shall finde 960 li. so much did the second Merchant lay in.

4 Two Merchants have companied together The first layd in 83 li. 6 s. 8 d. The second laid in 170 duckets, and they have gained 100 li. of the which the first man must have 60 li. I demaund what the Ducket was worth.

Answ. Seeing that the first man must have 60 li. it followeth that the second must have 40 li. Therefore say by the rule of Three, if 60 li. of gaine that the first man taketh, did lay in 83 li. 6 s. 8 d. principall, how much shall 40 li. gaine put in, which is the gain that the second man taketh? Multiply and divide, and you shall find 55 li. $\frac{5}{9}$, so much are the 170 Duckets worth. Then put 55 li. $\frac{5}{9}$ into shillings, and you shall have 1111 s. $\frac{1}{9}$. So then for to know what the Ducket is worth, say by the rule of Three, if the $\frac{170}{1}$, give 1111 $\frac{1}{9}$, what will $\frac{1}{1}$ give? Multiply and divide, and you shall finde 6 s, 6 d. $\frac{22}{153}$, so much is the Ducket worth.

5 Two Merchants having companied together, the second man laid in more by 30 li. then did the first man, and they gained 120 li. of the which the first man ought to have 50 li. I demaund what each of them did lay in? Answer. From 120 li. abate

50 li.

50 li. and there resteth 70 li. for the second mans part: so that by this meanes the second man (because he laid in 30 li. more then the first man did) he taketh 20 li. more of the gaine: and therefore say by the rule of three, if 20 li. gaine did lay in 30 li. principall, how much shall 50 li. gaine lay in? Multiply and divide, and you shall find 75 li. so much did the first man lay in, and consequently the second laid in 105 li.

6 Two Merchants have companied together, the 2d. hath laid in twice so much as the first man did, & 10 l. more: & they have gained 100 li. of the which, the first ought to have 32 li. for his part: I demand how much each of them did lay into company? Answer. If it were not for the 10 pound that the second man laid in more then the first, he should have had but 64 li. of the gaine, which is the double of the first mans part: But because he laid in 10 li. more, he hath therefore 4 pound more of the gaine, and therefore say by the rule of Three, if 4 li. gaine did lay in 10 pound of principall (which was over and above the double of the first mans layings in) what shall 32 li. of gaines lay in, which is the first mans part of the gaines that he taketh? multiply and divide & you shall find 80 li. for the first

mans laying in: and so consequently 170 li. for the second mans portion that he laid in.

7 Two Merchants have companied together, and they have gained 100 pound, of the which the first must have after the rate of 10 li. upon the 100 li. and the second must have after the rate of 15 li. upon the 100 li. I demaund how much each of them ought to have? Ans. Put 10 li. for the first mans laying in, and 15 li. for the second mans laying in. Adde therefore 10 li. and 15 li. together, and they make 25 li. Then put 10 over 25, & it is $\frac{10}{25}$ which being abbreviated are $\frac{2}{5}$. Therefore he y^t taketh 10 li. upon the 100 li. must have the $\frac{2}{5}$ of the gaine, which is 40 li. Then put 15 over 25, and it is $\frac{15}{25}$ which being abbreviated are $\frac{3}{5}$: Therefore the second must have $\frac{3}{5}$ of the 100 li. which is 60 li.

8 Two Merchants have conmpanied together, The first laid in 46 li. 18 s. and the second laid in 33 li. 2 s. so they have gained 30 li. I demaund how much every man shall have for his part of the gaine? Answ. Adde 46 pound 18 shil. and 33 li. 2 s. both together, and you shall find 80 li. for your common divisor: then say if 80 li. which is all their stocke doe gaine 30 li. what will 46 $\frac{9}{10}$ gaine? which is the money that the first

first man laid in: Multiply and divide, and you shall find 17 li. 11 shil. 9 d. for the firstmans part of the gaine. Then say againe by the rule of three, if 80 pound doe gaine 30 li. what will 33 li. $\frac{1}{11}$ gaine, which was the second mans money that he laid in: Multiply and divide, and you shall find 12 li. 8 s. 3 d. for the second mans part of the gaine.

And after the same maner shall you doe, in case that they were 3 or 4 merchants that would company together. Adding all and every of their sums of money (which they lay into the stock) into one totall sum, which shall be your common divisor: & then worke with the rest, as is taught in the former question of the rule of company.

Example.

9 Three Merchants have companied together, the first laid in I know not how much: the second did put in 20 peeces of cloth: and the third hath laid in 500 Pound. So at the end of their company, their gaines amounted unto a 1000 li. wherof the first man ought to have 350 li. and the second must have 400 li.

Now I demaund, how much the first man did lay in, and for how much the 20 peeces of cloth were put into company.

Answer.

Seeing that the first, and the second Merchants must have 750 pound for their part of the gaine; Then the third man must have the rest of the 1000 pound, which is 250 li. And therefore say by the rule of three; if 250 li. gaine, be come of 500 li. principall, of how much shall come 350 li. gaine, which the first man taketh? multiply and divide and you shall find 700 li. So much did the first man lay in: then say if 250 li. gaine, become of 500 li. principall, of how much will come 400 li. which is the gaine that the second man taketh? Multiply and divide and you shall find 800 li. For that price were the 20 peeces of cloth laid into company.

10 Three Merchants have gained 100 li. the first must have the $\frac{1}{2}$, the secōd must have the $\frac{1}{3}$, & the third must have the $\frac{1}{4}$. I demand how much every man must have of the gain? Ans. Reduce $\frac{1}{2}$, $\frac{1}{3}$ and $\frac{1}{4}$, into a common denomination, after the order of the second reduction in Fractions, and you shall find $\frac{12}{24}$, for the $\frac{1}{2}$, $\frac{8}{24}$ for the $\frac{1}{3}$, and $\frac{6}{24}$ for the $\frac{1}{4}$: Then take 12 for the first mans laying in, 8 for the second mans laying in, and 6 for the third mans laying in. The which three

three numbers being added together, shall be your common divisor, and they doe make 26. Then multiply 100 pound by 12, for the first man: then againe 100 li. by 8 for the second: and last of all 100 pound by 6 for the third man. And divide the products of every multiplication by 26. So shall you find 46 li. $\frac{2}{13}$ for the first mans part of the gaine: 30 li. $\frac{10}{13}$ for the second mans part: and 23 li. $\frac{1}{13}$, for the third mans part.

11 Two Merchants have gained 100 pound. The first must have $\frac{1}{2}$ and 5 pound more, the second must have $\frac{1}{3}$ and 4 li. more, I demand how much each of them shall have? Answer. First from 100 abate 5 and 4, which are 9, so there will remaine 91, then take the $\frac{1}{2}$ of 100 li. which is 50 li. for the first mans laying in. Likewise, take $\frac{1}{3}$ of 100 li. for the second mans laying in, which is 33 li. $\frac{1}{3}$: Then adde 50 li. and 33 li. $\frac{1}{3}$ together, and you shall have 83 li. $\frac{1}{3}$ for your common divisor: then multiply 91 pound by 50, and divide by 83 $\frac{1}{3}$, and therof commeth 54 li. $\frac{3}{5}$, unto the which number add 5, and all is 58 li. $\frac{3}{5}$ for the first mans part of the gaine. Likewise multiply 91 by 33 $\frac{1}{3}$, and divide by 83 $\frac{1}{3}$ and you shall find 36 li. $\frac{2}{5}$, unto the which adde 4, and you shall have 40 li. $\frac{2}{5}$ for the second mans part.

12 Two Merchants have gained 100 li. The first must have the $\frac{1}{2}$ lesse by 4 li. The second must have $\frac{1}{3}$ lesse by 2 Pound. I demaund how much each of them shall have? Answ. Adde 4 and 2 with 100, and they make 106. Then take as before is said, 50 li. for the first man: and 33 $\frac{1}{3}$ for the second, and adde them both together, and they be 83 $\frac{1}{3}$, which shall be your devisor. Then multiply 106 by 50. and divide the product by 83 li. $\frac{1}{3}$, so thereof commeth 63 li. $\frac{3}{5}$. From the which abate the 4 li. lesse that the first man taketh, and then is there remaining 52li. $\frac{3}{5}$ for his part. Likewise multiply 106 by 33 $\frac{1}{3}$, and divide by 83 $\frac{1}{3}$, and you shall find 42 li. $\frac{2}{5}$, from the which abate 2 pound lesse, and there remaineth 40 li. $\frac{2}{5}$ for the second mans part.

The Rule of Fellowship, with time.

The money that every man laieth in, must be multiplied by the time that it continueth in company: and of that which commeth thereof, you shall make their new layings in for each of them: and then multiply the gaines by every one of them severally, and the off-comes you shall divide by all their new layings in added together, and then you shall have proportionally, each mans

mans part of the gaine according to his laying in.

Example.

1 Two Merchants have companied together, the first hath put in the first of January, 450 pound, the second did lay in the 1 of May, 750 pounds. And at the yeares end, they had gained 100 li. I demaund how much each of them shall have of the gaine? Answer. For as much as the first did put 450 li. the first of January, his money contained in company 12 months, and therfore multiply 450 by 12 months, & thereof commeth 5400 for his new laying in. And the second laid in his 750 li. but at the first day of May: so that his money remained in company but 8 Monthes. Therfore multiply his 750 li. by 8 and thereof commeth 6000 for his new laying in. Then add 5400 with 6000, and they make 11400 for your common divisor. Then multiply 100 li. which is the gaines by 5400, and divide the product by 11400, and therof will come 47 li. $\frac{7}{19}$ for the first mans part of the gaine. Likewise, multiply 100 by 6000, and divide the product by 11400, and you shall find 52 $\frac{12}{19}$: and so much must the second man have for his part of the gaine.

2 Two Merchants have cõpanied together, the first hath laid in, the first of January, 640 li. The second can lay in nothing untill the first of Aprill. I demand how much he shall then lay in, to the end that he may take halfe the gaine? Answ. Multiply 640 li. by 12 moneths, that his money abideth in company, and therof will come 7680 li. for his laying in. And so much ought the second man to lay in, for because he taketh $\frac{1}{2}$ of the gaine. But for that, that he putteth in nothing untill the first of Aprill, his money can be in cõpany no longer then 9 moneths. And therfore divide 7680 by 9, and thereof will come 853 li. $\frac{1}{3}$. So much ought the second Merchant to lay in the first of Aprill, to the end that he may take the one halfe of the gaines.

3 Three Merchants have companied together, The first laid in the first of March 100 li. The second laid in the first of June so much money, that of the gaine he must have the $\frac{1}{3}$ part: and the third laid in the first of November so much money, that of the gaines he must have likewise $\frac{1}{3}$, and they continued in company untill the next March following. I demand how much the second and the third Merchants did lay in? Answ. Multiply 100 li. which the first man

did

did lay in, by twelve months, that his monie continued in company, and thereof cometh 1200 for his laying in, and so much ought the second and the third Merchants each of them to lay in, because they part the gaines by thirds. But for that, that the second Merchant layeth in nothing till the first of Iune, his monie can be in company but 9 months. Therefore divide 1200 by 9 months, and thereof will come 133 $\frac{1}{3}$. And so much ought the second Merchant to lay in. Then, forasmuch as the third Merchant did lay in nothing untill the first of November: his mony abideth in company but the space of 4 months. Therefore divide 1200 by 4, and thereof cometh 300 li. And so much ought the third Merchant to lay into company.

4 Three Merchants have companied together, the first laid in, the first of Ianuary, 100 Duckets. The second hath laid in 50 li. the first of March, and the third put in a Iewell, the first of Iuly, and at the yeers end, they had gained 400 crowns: of the which the first Merchant must have 50 Crownes, and the second must have 80. I demand what the Ducket was worth, and at what price the Iewell was valued, which the third Merchant laid in? Answ.

The

The first mans mony being 100 Duckets multiplied by 12 is 1200 Duckets by the rule aforesaid, and he taketh 50 Crownes for the gaine: therefore say if 50 Crownes gain be come of 1200, which was his stock, of how much shall come 80 Crowns gain, that the second man taketh? Multiply and divide, and you shall find 1920, for the second Merchants laying in. Then say again, if 50 Crowns be come of 1200 stock, of how much shall come 2700 Crownes, which the third man taketh of the gaine? Multiply and divide and you shall find 6480 for the third Merchants laying in. Then divide 1920, which is the second mans laying in, by 10 months, that his monie did continue in companie, and you shall find 192 Duckets, which are worth 50 li. because he laid in 50 li. Then divide 50 li. (being first reduced into shillings by the said 192 Duckets) and thereof will come 5 shillings 2 pence $\frac{1}{2}$. So much was the Ducket worth: Finally, divide 6480, (which is the third mans laying in) by 6 months that his Jewell remained in companie, and you shall find 1080 Duckets, and for that price was the Jewell put into companie.

5 Three Merchants have companied together:

together: The first laid in the first of January 100 li. and the first of Aprill he hath taken back again 20 li.

The second hath laid in the first of March 60 li. and afterward he did lay in more 100 li. the first of August. The third laid in the first of July 150 li. And the first of October hee did take back againe 50 li. And at the yeeres end, they found that they had gained 160 li. I demand how much every man shall have of the gaine?

Answer. Multiply 100 li. which the first man laid in by 12 months, and thereof commeth 1200 li. from that number abate nine times 20 li. which are 180 for that which he did take back again: and there will remain 1020, for the first mans laying in: Then multiply 60 which the second man laid in by 10, and you shall have 600: unto the which adde 5 times 100 li. for the mony he laid in more the first of August, which are 500, so all amounteth to 1100 for the second mans laying in. Afterwards multiply 150 pound, which the third man hath laid in, by 6 months, and thereof cometh 900, from the which number abate 3 times 50, and they are 150 for the mony that he did take back againe, the first of October, so there will remain 750, for the third mans

mans laying in. Then proceed with the rest, as is taught in the first question of the rule of Fellowship with time in adding 1020, 1100 & 750 all together, which shall be your divisor. Then multiply 160 li. which is the gaine by 1020, by 1100, and by 750: and divide at every time by your Divisor, that is to say, by all their layings in, added together, which is 2870: so you shall shall find 56 $\frac{248}{287}$ for the first man: 61 $\frac{93}{287}$ for the second: and 41 $\frac{233}{287}$ for the third man.

6 Two Merchants have companied together, The first hath laid in 960 pounds for the space of 12 months, and he ought to have 8 pound upon the 100 li. of the gaine. The second hath laid in 1120 li. for the space of 8 months, and hee ought to have after 12 pound upon the 100 pound of the gaine.

And at the yeers end, they have gained 800 li. I demand how much each of them shall have of the gain? Ans. Multiply 960 that the first man did lay in by 12 months, and the product thereof multiply again by 8, and you shall have 92160, for the first mans laying in: then multiply the 1120 that the second hath laid in by 8 moneths, and that which cometh thereof, you shall multi-

multiply againe by 12, and you ſhall find 107520, for the ſecond mans laying in. Then proceed with the reſt, as in the firſt queſtion of the rule of Fellowſhip is declared, as in the laſt example I have taught you, and you ſhall find 369 li. $\frac{3}{13}$ for the firſt man: and 430 li, $\frac{10}{13}$ for the ſecond man.

The Rule of Company, betweene Merchants, and their *Factors*.

NOte that the eſtimation of the body, or perſon of a Factor, is in ſuch proportion to the ſtock which the Merchant layeth in, as the gaine of the ſaid factor is unto the gaine of the Merchant. As thus, if a Merchant doe deliver into the hands of his Factor 200 li. to employ, and he to have halfe the profit, the perſon of the ſaid Factor ſhall be eſteemed to be worth 200 li. And if the Factor do take but the $\frac{1}{3}$ of the gain, he ſhould have but $\frac{1}{2}$ ſo much of the gain as the Merchant taketh which muſt have $\frac{2}{3}$: wherefore the perſon of the Factor is eſteemed but the $\frac{1}{2}$ of that which the Merchant layeth in, that is to ſay, 100 li.

And if the Factor did take the $\frac{2}{3}$ of the gaine,

gaine, then the Merchant shall take the residue, which are $\frac{3}{5}$ of the gain: wherefore the gain of the Merchant unto that of the Factor, is in such proportion as 3 unto 2. Then if you will know the estimation of the person of the Factor, say if 3 give me 2, what will 200 give? Multiply 200 by 2, and divide by 3, so you shall find 133 $\frac{1}{3}$. Or otherwise you must consider that the Factor taketh the $\frac{2}{3}$ of that which the Merchant taketh. And therefore take the $\frac{2}{3}$ of of 200, and you shall find 133 $\frac{1}{3}$ as before: and so much is the person of the Factor esteemed to be worth.

8 And if the Merchant should deliver unto his Factor 200 li. and the Factor would lay in 40 li. and his person to the end he might have the halfe of the gaine: I demand for how much shall his person be esteemed?

Answer. Abate 40 li. from 200 li. and there will remain 160 li. and at so much shall his person be esteemed.

And if the Factor would take the $\frac{2}{3}$ of the gain, his person with his 40 pound shall bee esteemed twice as much as the stock that the Merchant layeth in, which should have put $\frac{1}{3}$ of the gain, for $\frac{2}{3}$ unto $\frac{1}{3}$ is in double proportion. Therefore double

200

200 Pounds, and thereof cometh 400 li. from the which abate 40 li. and there will remain 360 li. But if the Factor would take only the $\frac{1}{3}$ of the gain, that shall be but the $\frac{1}{2}$ of $\frac{2}{3}$ which the Merchant taketh: and then the estimation of his person with his laying in should be esteemed but the halfe of that which the Merchant layeth in: you must therefore take the $\frac{1}{2}$ of 200 li. which is 100 li. from the which you shall abate 40 pound, and the rest which is 60 li, is the estimation of his person.

9 If it so chance for to make traffick of 240 li. that the person of the Factor should be in such wise esteemed that he should have but the $\frac{1}{4}$ of the gaine, and yet he would have the $\frac{1}{2}$, I demand how much ready mony he ought to lay in, besides his person? Answ. Seeing that his person gaineth the $\frac{1}{4}$, therefore all the whole laying in, which is 240 li. shall gaine the rest, that is to say, the $\frac{3}{4}$. Now because $\frac{1}{4}$, is the $\frac{1}{3}$ of $\frac{3}{4}$, therefore his person shall be esteemed the $\frac{1}{3}$ of all the laying in. Take then the $\frac{1}{3}$ of 240 li. and you shall have 80 li. for the estimation of his person, and for because that he will have halfe of the gaine, you shall adde 80 li. with 240 li. and thereof cometh 320 li. of the which take the halfe, which is 160 li.

li. and from the same you shall abate the 80 li. and there will remaine other 80 li. which he ought to lay in of ready mony, and the Merchant must lay in the over-plus, which amounteth to 160 li.

10 A Merchant hath delivered to the Factor 1200 li. to govern them in the trade of Merchandize upon such condition, that he for his service shall have the $\frac{1}{3}$ of the gaine, if any thing be gained, and he shall beare the $\frac{1}{3}$ of the losse, if any thing be lost: I demand, for how much his person was esteemed? Answ. Seeing that the Factor taketh the $\frac{1}{3}$ of the gain, his person ought to be esteemed as much as $\frac{1}{2}$ of the stock which the Merchant layeth in, that is to say, the $\frac{1}{2}$ of 1200 li. which is 600 li. The reason is, for because the $\frac{1}{3}$ of the gaine that the Factor taketh, is the $\frac{1}{2}$ of the $\frac{2}{3}$ of the gaine that the Merchant taketh. And so the Factor his person is esteemed to bee worth 600 li.

11 A Merchant hath delivered unto his Factor 1200 li. and the Factor layeth in 500 li. and his person. Now because he layeth in 500 li. and his person, it is agreed between them, that hee shall take $\frac{2}{5}$ of the gain: I demand, for how much his person was esteemed? Answ. Forasmuch as the Factor

Factor taketh the $\frac{2}{5}$ of the gain, he taketh the $\frac{2}{3}$ of that which the Merchant taketh, for $\frac{2}{5}$ are the $\frac{2}{3}$ of $\frac{3}{5}$: and therefore the Factors laying in, ought to be 800 li. which is the $\frac{2}{3}$ of 1200 li. that the Merchant layd in. Then abate 500 li. which the Factor did lay in from 800 li. which should be his whole stock, and there remaineth 300 li. for the estimation of his person.

12 More, a Merchant hath delivered unto his Factor 1000 li. upon such condition, that the Factor for his paines and service, shall have the gaines of 200 li. as though he laid in so much ready mony: I demand what portion of the gain the said Factor shall take? Answ. See what part the 200 li. (which the Factor laid in) is of 1200, which is the whole stock of their company, and you shall find that is the $\frac{1}{6}$, and such part of the gain shall the Factor take.

But in case, that in making their covenants, it were agreed between them, that the Factor should have the gain of 200 li. of the whole stock which the Merchant layeth in, that is to say, of the 1000 li. then should the Fa.tor take the $\frac{1}{5}$ of the gaine: for 200 li. is the $\frac{1}{5}$ of a 1000 li.

Chap. 11.

Of the Rules of Barter: that is to say, to change ware for ware, &c.

1. TWo Merchants will change their Merchandize, the one with the other. The one of them hath cloth of 7 s. 1 d. the yard, to sell for ready mony, but in barter he will sell it for 8 s. 4 d. The other hath Cinamon of 4 s. 7 d. the li. to sell for ready mony, I demand how he shall sell it in barter that he be no loser? Answ. Say if 7 $\frac{1}{12}$ (which is the price that the yard of Cloth is worth in ready mony) be sold in barter for 8 $\frac{1}{3}$, for what shall 4 $\frac{7}{12}$ be sold in barter, which 4 $\frac{7}{12}$ is the price that the li. of Cinamon is worth in ready mony? reduce the whole numbers into their broken, and then multiply and divide and you shall find five shillings foure pence, $\frac{12}{17}$ parts of a penny, and for so much shall he sell the pound of Cinamon in barter.

2 Two Merchants will barter their Merchandize the one with the other: the one of them hath Chamblets, of 2 li. 18 s. 4 d. the peece, to sell for ready mony, and in barter he will sell the piece for 4 li. 3 s. 4 d, the other hath fine caps of 35 s, 10 d. the dozen, to

to sell in barter. I demand what the dozen of caps were worth in ready mony? Answ. say if 4 li. 3 s. 4 d. which is the over price of the peece of Chamblet, become of 2 li. 18 s. 4 d. which was the just price of the same, of what shall come 35 s. 10 d. which is the over-price of the dozen of caps? Multiply and divide, and you shall find 25 s. 1 d. and so much are the dozen of cappes worth in ready money.

3 Two Merchants will change their Merchandize the one with the other: the one of them hath Fustians of 18 s. 4 d. the peece to sell for ready mony, and in barter he will sell the peece for 26 s. 8 d. The other hath tapistry of 15 d. the Ell to sell for ready mony, and in barter he will sell it for 20 d. the Ell. I demand which of them gaineth, and how much upon the 100 li. of mony? Ans. Say if 18 s. $\frac{1}{3}$ (which is the just price of the peece of Fustian) be sold in barter for 26 s. $\frac{2}{3}$: for how much shall 1 s. $\frac{1}{4}$, (which is the just price of the Ell of Tapistry) be sold in barter? multiply and divide, and you shall find 21 d. $\frac{9}{11}$. And he doth over-sell it but for 20 d. So that of 21 $\frac{9}{11}$ he maketh but 20 d. And therefore say by the rule of 3, if the second Merchant, of 21 $\frac{9}{11}$ do make but $\frac{20}{1}$, how much shall he

 lose

lose in the $\frac{100}{1}$. Multiply and divide, and you shall find $91\frac{2}{3}$ the which being abated from 100, there will remain $8\frac{1}{3}$. And after the rate of $8\frac{1}{3}$, doth the second Merchant lose in the 100. And consequently, the first Merchant of 20 d. maketh 21 pence $\frac{9}{11}$, and therefore say again by the rule of three, if the first Merchant of $\frac{20}{1}$ do make $21\frac{9}{11}$, how much shall he gain upon $\frac{100}{1}$? Multiply and divide, and you shall find 109 li. $\frac{1}{11}$. And thus the first Merchant gaineth after the rate of 9 li. $\frac{1}{11}$ upon the 100 li. of mony.

Note. For your better understanding of these questions, you must note, that when one M:rchant gaineth of another after the rate 10 li. upon the 100 li. he gaineth the $\frac{1}{10}$ of his own principall, and the other which loseth after the rate of $9\frac{1}{11}$ in the 100 li. hee loseth the $\frac{1}{11}$ of his principall. And it may be proved thus: when one Merchant will sell his wares unto another, which wares stand him but in a 100 li. and he will sell them for 110 li. therefore he of his 100 li. maketh 110 li. and so he gaineth after 10 li. upon the 100, which is the $\frac{1}{10}$ of his principall, and the other which buyeth wares for 110 pound, that cost the other but 100 li. of the 110 li. he maketh but 100 li. and therefore, say by the rule of 3, if 110 be come of

100

100, how much shall come 100? Multiply and divide, and you shall find $90\frac{10}{11}$. the which abate from 100 and there will remain $9\frac{1}{11}$ which is the $\frac{1}{11}$ of the principall that the second loseth in the 100 li. as before is said. And therefore, who so that will know what one Merchant gaineth of another, either after the rate of 10 li. upon the 100 li. which is the $\frac{1}{10}$ of his principall, or else after the rate of 20 li. upon the 100 li. which is the $\frac{1}{5}$, or of any other part, and that he would likewise know what part the other loseth of his principall, he must take for the numerator of the broken number of him that loseth, as much as for him that gaineth, then adde the numerator and the denominator (of the broken number of him that gaineth) both together, and make thereof the denominator of the broken number of him that loseth, & then shall you have the just part of him that loseth: as by example, of him that gaineth after 10 li. upon the 100 li. which is the $\frac{1}{10}$ of his principall: take the numerator of $\frac{1}{10}$ which is 1, and make that the numerator of the broken number of him that loseth, then adde 1, which is the numerator of the fraction of him that gaineth with 10, which is his denominator, and you shall have 11 for the denomina-

for of the Fraction of him that loseth. Then put 1 over the 11 and so you shall have $\frac{1}{11}$. Thus it appeareth when one Merchant gaineth of another after 10 li. upon the 100 li. hee gaineth the $\frac{1}{10}$ of his principall, and the other loseth $9\frac{1}{11}$, which is the $\frac{1}{11}$ of his principall. And if he would gain after 20 upon the 100 li. which is the $\frac{1}{5}$ of his principall, the other should lose $16\frac{2}{3}$, which is the $\frac{1}{6}$ of his principall, and so is to be understood of all other Fractions.

4 Two Merchants will change their Merchandize, the one with the other, the one of them hath Sayes of 20 s. and 10 d. the peece to sell for ready mony: and in barter he will sell the peece for 23 s. 4 d. and yet hee will gain moreover, after 10 li. upon the 100 pound. The other hath wooll of 50 s. the 100 waight to sell for ready mony. I demand how hee shall sell C. of wooll in barter? Answ. Say, if 20 s. 10 d. which is the just price of the peece of Say, be sold in barter for 23 s. 4 d. for how much shall 50 s. (which is the just price of the C. of wooll) be sold in barter? Multiply and divide, and you shall find 56 s. Then for because the first Merchant will gain after 10 li. upon the 100 li. he maketh of his 100 li. 110 li. so the second Merchant maketh

keth of 110 li. but 100 l. And therefore say by the rule of 3, if the second Merchant of 110 doe make but 100, how much shall he make of 56? Multiply and divide, and you shall find 50 s. 10 d. $\frac{10}{11}$ of a penny, and for so much shall he sell the Hundred of Wooll in barter.

5 More, two Merchants will change their Merchandize the one with the other, the one of them hath Taffeta of 16 crowns the peece, to sell for ready mony, and in barter he will sell the peece for 20 crowns, and yet he will gain moreover after the rate of 10 li. upon the 100 li. The other hath ginger of 3 s. 9 d. the pound waight, to sell in barter. I demand what the pound did cost in ready mony? Answ. Say if 20 crownes which is the surprice of the peece of Taffeta, become of 16 crowns the just price, of how much shall come 3 s. 9 d. which is the surprice of the pound of Ginger? Multiply and divide, and you shall find 3 shill. Then, for because that the Merchant of Taffata will gain after the rate of 10 upon the Hundred: Say if one Hundred doe give 100, what shall 3 shillings give? Multiply and divide, and you shall find 3 shillings 3 pence $\frac{3}{5}$, and so much did the Pound of Ginger cost in ready mony.

6 More, two Merchants will change their Merchandize, the one with the other, the one of them hath Worsteds of 25 s. the peece to sell for ready mony, and in barter he will sell the peece for 33 s. 4 d. and yet he loseth after 10 li. in the 100 li. the other hath Ware of 3 li. 6 s. 8 d. the 100 waight to sell for ready mony. I would know for what price he should sell his Ware in barter? Answ. Say if 25 s. which is the just price of the peece of Worsted, be sold in barter for 33 s. 4 d. for how much shall 3 li. 6 s. 8 d. be sold? which is the just price of the 100 of ware, as it was worth in ready mony. Multiply and divide and you shall find 4 li. $\frac{4}{9}$ which is 8 s. 10 d. $\frac{2}{3}$, then for because that the Merchant of Worsteds, loseth after 10 li. in the 100 li. of 100 li. he maketh but 90 and therefore say, if 90 give 100, what giveth 4 pound $\frac{4}{9}$? Multiply and divide, and you shall find 4 li. $\frac{76}{81}$, which is worth 18 s. 9 d, $\frac{5}{27}$ and for so much shall he sell the 100 li. waight of Ware in barter.

7 More, Two Merchants will change their Merchandize the one with the other: the one of them hath worsteds of 5 li. 6 shillings 8 pence the peece to sell for ready mony, and in Barter he will sell the peece for 6 li. 13 s. 4 d. and yet he loseth after 10 li. in

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the 100. and the other hath Muske of 2 s. 9 d. $\frac{1}{3}$ the pound waight to ſell in barter. I demand what the Pound did coſt in ready money? Anſw. Say if 6 li. $\frac{2}{3}$, which is the overprice of the peece of Worſted, becom of 5 li. $\frac{1}{3}$, which is the juſt price of the ſame, of how much ſhall come 2 s. 9 d. $\frac{1}{3}$? Multiply and divide, and you ſhall find 2 s. $\frac{2}{9}$, which $\frac{2}{9}$ is 2 d. $\frac{2}{3}$: then for becauſe that the merchant of Worſteds loſeth after 10 li. in the 100 li. of a 100 he maketh but 90: and therefore ſay, if 100 give but 90, how much ſhall 2 s. $\frac{2}{9}$ give? Multiply and divide, and you ſhall find 2 s. and ſo much coſt the pound of Muske in ready money.

Other Rules of Barter, wherein is *given ſome part in ready money.*

When a Merchant overſelleth his merchandize, and he will have alſo ſome part of his over price in ready money: as the $\frac{1}{2}$, the $\frac{1}{3}$, or the $\frac{1}{4}$, &c. He muſt ſubſtract the ſame part of money from the juſt price, and alſo from the over price of his Merchandize: and the two numbers that remaine after the ſubſtraction is made, ſhall be the two firſt numbers in the rule of three: and the juſt price of the ſecond Merchant ſhall be the third number: ſo know how

how much he shall oversell the part of his merchandize.

Example.

8 Two Merchants will change their merchandize the one with the other, the one of them hath fine Wooll at 5 li. the 100 li. waight to sell for ready money, and in barter he will sell it for 6 li. and yet he will have the $\frac{1}{3}$, in ready money. The other hath cloth of 13 s. 4 d. the yard to sell for ready money. I would know how he shall sell the same in barter? Answ. take the $\frac{1}{3}$ of 6 li. which is the over price of the 100 of wooll, and that is 2 li. the which you must abate from 5 li. which is the just price of the C. of wooll, and also abate it from 6 li. which is the overprice, and there shall rest 3 li. and 4 li. for the two first numbers in the rule of three; then take 13 s. 4 d. which is the just price of a yard of cloth, for the third number: Then multiply and divide, and you shall find 17 s. 9 d. $\frac{1}{3}$ for so much shall the second sell his cloth in barter.

9 More, two merchants will change their merchandize the one with the other, the one of them hath wax of 3 li. 6 s. 8 d. the C. to sell for ready money, and in barter he will sell the same for 4 li. 3 s. 4 d. and yet he

he will have the $\frac{1}{4}$ in ready money: And the other hath fine Crimson Satten of 15 s. the yard, to sell in barter. I demand what it is worth in ready money? Answ. Take the $\frac{1}{4}$ of 4 li. 3 s. 4 d. which is 1 li. 0 s. 10 d. and abate it from 4 li. 3 s. 4 d. and also from 3 li. 6 s. 8 d. and there resteth 3 li. 2 s. 6 d. and 2 li. 5 s. 10 d. for the two first numbers in the Rule of three. And 15 s. for the third number which 15 s. is the over price of the yard of Satten. Then Multiply and divide and you shall find 11 s. And so much did the yard of Satten cost in ready money.

10 Two Merchants will change their merchandize the one with the other: the one of them hath Tinne of 50 s. C. waight, to sell for ready money, and in barter he will sell it for 3 li 6 s, 8 d. and he will gaine after 10 li. upon the 100 li. & yet he will have also the one halfe in ready money. The other hath lead of 3 halfe pence the pound, to sell for ready money. I demand how he shal sell the li. of Lead in barter? Answer. See first at 10 li. upon the 100 li. what the 3 li. $\frac{1}{3}$ will come unto, in saying by the Rule of Three, if 100 give 110, what will 3 $\frac{1}{3}$, give? Multiply and divide, and you shall find that they will come to 3 li. $\frac{2}{3}$, which is 13 s. 4 d. of the which, the halfe which he demandeth

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in ready money, is 36 s.8 d. the same being abated from 50 s. and also from 3 li. 13 s. 4 d. there will remaine 13 s. 4 d. and 1 li. 16 s. 8 d. for the two first numbers in the Rule of three, which you must put all into halfepence, and the aforesaid three halfepence shall be the third number, and then multiply and divide, and you shall find 4 d. $\frac{1}{5}$, and for so much shall he sell the 1 li. of lead in barter.

11 More, Two Merchants will change their merchandize the one with the other: the one of them hath steele of 16 s. 8 d. the 100 li. waight, to sell for ready money, and in barter he will sell it for 25 s. and yet he loseth after 10 l. in the 100 li. but he will have the $\frac{1}{2}$ in ready money: the other hath yron of 6 s. 8 d. the hundred to sell in barter. I demand what the hundred of yron did cost in ready money? Answer. say if 100 come but to 90, how much shall 25 s. come to? Multiply and divide, and you shall find 22 s. 6 d. of the which number, take the $\frac{1}{2}$ which is 11 s. 3 d. and substract it from 22 s. 6 d. and also from 16 s. 8 d. and there will remaine 11 s. 3 d. and 5 s. 5 d. for the 2 first numbers in the rule of three, and 6 s. 8 d. which is the over price of a hundred of yron for the third number: then multiply and

and divide 4, you shall find 3 s.2 d. $\frac{14}{37}$: and so much did the hundred of yron cost in ready money.

12 More, two merchants will change their merchandize the one with the other: the one of them hath Sayes of 20 s.10 d. the peece to sell for ready money, and in barter he will sell the peece for 25 s. and he will have the $\frac{1}{4}$ in ready money. The other hath caps of 35 s. the dozen, to sell for ready money, but he will gaine after the rate of 10 li. upon the 100 li. I demand how he shall sell a dozen of caps in barter?

Answ. Say if 100 be worth 110. What shall 35. s. be worth, which is the just price of the dozen of caps? Multiply and divide, and you shall find 38, s.6 d. Then take $\frac{1}{4}$ of 25 s. which is 6 s. 3 d. and substract it from 20 s.10 d. and also from 25 s. and there will remain 14 s.7 d. and 18 s.9 d. for the 2 first numbers in the rule of three, and 38 s.6 d. which is the just price with his gaine in the dozen of caps for the third number: then multiply and divide, and you shall find 49 s. 6 d. and for so much he shall sell the dozen of caps in barter.

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in ready money, is 36 s.8 d. the same being abated from 50 s. and also from 3 li. 13 s. 4 d. there will remaine 13 s. 4 d. and 1 li. 16 s. 8 d. for the two first numbers in the Rule of three, which you must put all into halfepence, and the aforesaid three halfepence shall be the third number, and then multiply and divide, and you shall find 4 d. $\frac{1}{5}$, and for so much shall he sell the 1 li. of lead in barter.

11 More, Two Merchants will change their merchandize the one with the other: the one of them hath steele of 16 s. 8 d. the 100 li. waight, to sell for ready money, and in barter he will sell it for 25 s. and yet he loseth after 10 l. in the 100 li. but he will have the $\frac{1}{2}$ in ready money: the other hath yron of 6 s. 8 d. the hundred to sell in barter. I demand what the hundred of yron did cost in ready money? Answer. say if 100 come but to 90, how much shall 25 s. come to? Multiply and divide, and you shall find 22 s. 6 d. of the which number, take the $\frac{1}{2}$ which is 11 s. 3 d. and substract it from 22 s. 6 d. and also from 16 s. 8 d. and there will remaine 11 s. 3 d. and 5 s. 5 d. for the 2 first numbers in the rule of three, and 6 s. 8 d. which is the over price of a hundred of yron for the third number: then multiply and

and divide 4, you shall find 3 s. 2 d. $\frac{14}{27}$: and so much did the hundred of yron cost in ready money.

12 More, two merchants will change their merchandize the one with the other: the one of them hath Sayes of 20 s. 10 d. the peece to sell for ready money, and in barter he will sell the peece for 25 s. and he will have the $\frac{1}{4}$ in ready money. The other hath caps of 35 s. the dozen, to sell for ready money, but he will gaine after the rate of 10 li. upon the 100 li. I demand how he shall sell a dozen of caps in barter?

Answ. Say if 100 be worth 110. What shall 35. s. be worth, which is the just price of the dozen of caps? Multiply and divide, and you shall find 38, s. 6 d. Then take $\frac{1}{4}$ of 25 s. which is 6 s. 3 d. and substract it from 20 s. 10 d. and also from 25 s. and there will remain 14 s. 7 d. and 18 s. 9 d. for the 2 first numbers in the rule of three, and 38 s. 6 d. which is the just price with his gaine in the dozen of caps for the third number: then multiply and divide, and you shall find 49 s. 6 d. and for so much he shall sell the dozen of caps in barter.

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Chap. 12.

Of Exchanging of money from one place to another.

First you must note, that at Antwerpe they use to make their accounts by Deniers de gros, that is to say, by pence Flemmish, whereof 12 doe make 1 s. Flemmish, and 20 shil. Flemmish doe make 1 li. de gros.

Example.

1 If I deliver in Flanders 500 li. Flemmish at 19 s. 6 d. de gros, that is to say, at 19 s 6 d. Flemmish, to receive 20 s. at London; I demaund how much I shall receive sterling at London for the said 500 li. Flemmish? Ans. Say if $19\frac{1}{2}$ give $\frac{20}{1}$, what will $\frac{500}{1}$ give? Multiply and divide, and you shall find 512 li. 16 s. 4 d. $\frac{12}{13}$ of a penny. And so much sterling shall I receive in London for my 500 pound Flemmish.

2 If I deliver in London 375 li. sterling, to receive in Antwerp 21 s. 9 d. de gros, that is to say, Flemmish, for every sterling. I demand how many pounds Flemmish I shall receive in Antwerp for the said 375 li. sterling? Answer. Say if $\frac{20}{1}$ give $21\frac{3}{4}$ what will $\frac{375}{1}$ give? Multiply and di-

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vide and you shall find 407 pound 16 shil. 3 d, So many Pounds Flemmish shall I receive at Antwerp for the said 375 li. sterling in Antwerp.

3 If I take up money at Antwerp, after 19 s. 6 d. Flemmish, to pay for the same at London 20 s. ster. and when the day of payment is come, I am forced to returne the same, and to take up money againe in London to pay my bill of exchange, so that for 20 s. which I take up here I must pay 19 s. 9 d. at Antwerp. I demand whether I doe winne or lose, and how much in, or upon the 100 li. of money? Answ. Say, if $19\frac{3}{4}$, give $19\frac{1}{2}$, what will $\frac{100}{1}$ give? Multiply and divide, and you shall find $98\frac{58}{79}$, the which being abated from 100, there will remaine $1\frac{21}{79}$. And so much doe I lose upon the 100 pound of money.

4 If I take up at London 20 s. sterling to pay at Antwerp, 21 s. 8 d. Flemmish; and when the day of payment is come, my Factor is constrained to take up money againe at Antwerp, wherewith to pay the foresaid sum: and there he doth receive 22 s. Flemmish, for the which I must pay 20 s. at London. Now I demand whether I doe winne or lose, and how much upon the 100 li. of money after the rate? Ans. Say if

$21\frac{2}{3}$ give $\frac{22}{1}$. What will $\frac{100}{1}$, give? Multiply and divide, and you shall find $101\frac{7}{13}$, from the which abate 100, and there will remain $1\frac{7}{13}$, and so much shall I gaine upon the 100 pound of money.

The Exchange from London into France, is not like as it is in Flanders, but is delivered by the French Crowne, which is worth 50 Souse Tournois the peece.

And here must you note, that in France they make their account by Deniers Tournois, whereof 12 Deniers maketh 1 souse Tournois, and 20 souse Tournois maketh 1 li. Tournois, which they call a Liure or Franc, and the French Crowne is currant among merchants for 51 souse Tournois, but by exchange it is otherwise, for they will deliver but 50 Souse Tournois, which is 2 li. 10 Souse Tournois for a Crowne, and at such price the Crowne, as the taker up of money can agree with the deliverer.

Example.

5 If I deliver 340 li. ster. here in London, after 6 s. 4 d. sterling the Crowne, to receive at Roan, or at Paris 50 Souse Tournois for every Crowne, I would know how many Liures Tournois, I shall receive

receive there for my 340 li. sterling? Ans. Say if 6 s. $\frac{1}{3}$ ster. doe give me 2 li $\frac{1}{2}$, Tournois, what will $\frac{6800}{1}$ s. give, (which is the 340 li. reduced into shillings.) Then multiply and divide, and you shall find 2684 Livres, $\frac{4}{19}$ which is worth 4 souse $\frac{4}{19}$ Tournois, and so much shall I receive in Roan or Paris for my 340 li. sterling.

6 If I deliver in Paris or Roan, or elsewhere in France 1250 Livres Tournois, at 50 souse Tournois the Crowne, to receive for every such Crowne 6 s. 3 d. sterling in London. I demand how much sterling money I shall receive at London for my 1250 pound Tournois? Answer. Say, if 2 li. $\frac{1}{2}$, doe give me 6 s. $\frac{1}{4}$, what will $\frac{1250}{1}$ give? Multiply and divide, and you shall find 3125 s. sterling, which maketh 156 li. 5 s. sterling. And so many pounds shall I receive at London for the said 1250 Livres Tournois, after 6 s. 3 d. for every Crowne of 50 soulz.

Chap. 13.
Of the Rule of Alligation or Mixture.

The Rule of Alligation is ſo named for that it teacheth to alligate or binde together diuers parcels of ſundry prices, and to know how much you ſhall take of euery parcell, according to the numbers of the queſtion, the which Rule is diſtinct into two parts: as followeth.

The firſt part of the rule of alligation ſheweth how to make a mixture of diuers things being of ſundry prices: And of the ſame things ſo mixed, to know the common price of the ſaid mixture.

Example.

1 A man would mix 5 buſhels of Wheat at 2 ſhil. 8 d. the buſhel, with 9 buſhels of Rie, at 2 s. the buſhel, and would know how much the buſhel ſo mixed doth ſtand him in, the one with the other? Anſw. For to know the ſame common price, you muſt multiply euery thing by his price, and add all the products together: the which you muſt diuide by the number of all the things

the

that are to be mixed, and the quotient will answer to the question, as in the foresaid example, I multiplie 5 bushels by his price, that is to say, by 2 s. 8 d. & thereof commeth 13 s. 4 d. Likewise I multiply 9 bushels by 2 s. maketh 18 s. both these sums added together, doe make 31 s. 4 d. the which I doe reduce into pence: and they make 376 pence. Then I divide 376 by 14 which is the number of all the bushels, and my quotient will be 26 pence and $\frac{6}{7}$, and so much doth one Bushel of both the sorts of graine stand him in.

2 If you have two severall things, whereof you would mix equall portions together, you must adde their prices and take onely the $\frac{1}{2}$. if you would mix together equall portions of 3 things, you must take $\frac{1}{3}$, and of 4 the $\frac{1}{4}$ and so continuing, as by Example: Wheat of 2 shil. 8 d. the bushel, and Rie of 2 s. the bushel being mingled by equall proportions, I adde 2 shil. 8 d. and 2 s. together, and they make 4 s. 8 d. whereof the one $\frac{1}{2}$ is 2 s. 4 d. and so much is the value of one Bushel of such a mixture. And if there were a portion of barley at 20 d. then I must adde 2 s. 8 d. 2 s. & 20 d. together, and they make 6 s. 4 d. where of the $\frac{1}{3}$ which is 2 s. 1 d. $\frac{1}{3}$ should be the price of one bushel of that mixture.

3 A Merchant hath 27 li. waight of large Cloves at 6 s. the li. 15 li. of the middle ſort at 2 s. 6 d. the. li. And 10 li. of fuſte at 2 s. 2 d. the li. when all that ſame are mixed together, I would know how much the li. is worth?

Anſwer. You muſt multiply every drug by his price, and then divide the totall ſum of the products, by the whole waight of the drugs, and you ſhall find 4 ſhill. 3 pence $\frac{1}{26}$, and ſo much is the li. of that mixture worth.

27	*at*	6 s.	0 d.	162
15	*at*	2 s.	6 d.	$37\frac{1}{2}$.
10	*at*	2 s.	2 d.	$21\frac{2}{3}$.
52				$221\frac{1}{6}$.

4 And if you would mix $\frac{1}{2}$ large cloves, $\frac{1}{3}$ of middle, and $\frac{1}{4}$ of fuſt, and you would know how much the pound waight were worth, you muſt take a number, which containeth thoſe parts: as for example 12; whereof the $\frac{1}{2}$, which is 6 ſhall ſignifie ſo many pound of large cloves: The $\frac{1}{3}$ which is 4, ſhall be ſo many li. of middle, & the $\frac{1}{4}$, which is 3. ſhall be ſo many li. of fuſt. Then afterwards you muſt multiply every drug by his price, and divide the totall ſumme of all the products, by the whole ſumme of the

the drugs, and you ſhall find 4 s. $\frac{1}{18}$. And ſo much is 1 pound waight of the mixture.

6. at 6 s. 0 d.	36
4. at 2 s. 6 d.	10
3. at 2 s. 2 d.	06 $\frac{1}{2}$
13	52 $\frac{1}{2}$

5 And if you would make 100 li. waight of ſuch a mixture, you ſhall work by the rule of company, and you ſhall find 46 li. $\frac{2}{13}$ of large cloves, 30 li. $\frac{10}{13}$ of middle. And 23 $\frac{1}{13}$ of fuſt.

$$\left.\begin{array}{r} 6 \\ 4 \\ 3 \\ \hline 13 \end{array}\right| \quad 13 \qquad 100\left\{\begin{array}{l} 6?\ \textit{Anſ}.\ 46\frac{2}{13} \\ 4?\ \textit{Anſ}.\ 30\frac{10}{13} \\ 3?\ \textit{Anſ}.\ 23\frac{1}{13} \\ \hline \qquad 100 \end{array}\right.$$

6 A Goldſmith hath 8 li. waight of ſilver billion of 7 ounces fine, more 15 li. of 8 ounces $\frac{1}{2}$ fine, and 13 li. waight of 10 ounces fine, and he will melt all theſe together, and make of them one maſſe. The queſtion is to know of what fineneſſe the Pound waight is? Anſw. You muſt multiply the number of the waights of every Billion by his fineneſſe, and thereof will come the ounces and parts of ounces fine, the which you muſt adde together, and they

will make 313 ounces $\frac{1}{2}$ of fine, the same you must divide by 36 which is the whole Sum of the pound waight of Billion, and you shall find 8 ounces and $\frac{51}{72}$ remaining, which $\frac{51}{72}$ parts of an ounce is worth 14 peny waight and 4 graines, and so much is the pound waight of this mixture worth.

8 *Lib.*	*at*	7 *ounc.*	*is*	56
15	*at*	8 *ounc.* $\frac{1}{2}$	*is*	127 $\frac{1}{2}$
13	*at*	10 *ounc.*	*is*	130
36				313 $\frac{1}{2}$

7 A Goldsmith hath 3 sorts of Silver Billion, that is to say, 5 li. 7 ounces 10 penny waight, at 7 ounces $\frac{1}{3}$ fine: 12 li. 3 ounces, at 6 ounces $\frac{1}{3}$ fine. And 4 li. at 9 ounces fine. All the which he will melt into one masse. The question is to know, of what finenesse the pound waight of that mixture shall be? Ans. You must multiply every Billion by his finenesse, as afore. And adde together all the products, & they doe amount to 155 li. $\frac{37}{48}$. Then adde all the waights of the Billions together into one summe, and they make 21 li. $\frac{7}{8}$, divide then 155 $\frac{37}{48}$, by 21 $\frac{7}{8}$, and your quotient will be 7 ounces and $\frac{1016}{8400}$ remaining, the which $\frac{1016}{2400}$ being brought into penny waights and graines, doe make 2 penny waight, 10 graines, $\frac{2}{3}$ of a grain

graine fine: So you may perceive that the same mixture is of 7 ounces, 2 d. 10 grains, and $\frac{2}{33}$ of a grain fine, the pound waight.

And here is to be noted, that the reckoning of the waights of Silver is thus as followeth, that is to say,

1 lt. of Troy waight, maketh 12 Ounces.

1 Ounce is divided into 20 penny waight.

1 Penny waight is distributed into 24 graines.

1 Graine into 20 smaller parts, &c.

And the reckoning for Gold, is thus,

1 Ounce of fine Gold without any alloy, is imagined to be 24 karets.

1 Karet is divided into 4 graines.

1 Graine is parted into 2 halfe graines or 4 quarters of a graine, &c.

And so into other smaller parts.

8 But if the said Goldsmith would put 5 lt. waight of Copper with the said Billions, and you would know of what finenesse it is, then you must adde the same 5 lt. with the 21 lt. $\frac{7}{8}$, and it maketh 26 $\frac{7}{8}$. Then divide the aforesaid 155 lt. $\frac{37}{48}$, by 26 lt. $\frac{7}{8}$, and you shall find 5 ounces fine, and $\frac{8216}{10320}$ remaining, the which $\frac{8216}{10320}$ is worth 15 peny waight, 22 graines and $\frac{6}{43}$. And of that finenesse will the same masse be.

9 A Goldsmith hath melted 12 pound waight, and 5 ounces of Gold Billion, being of 18 Karets fine, with 4 li. waight, 4 ounces and $\frac{1}{2}$, at 21 Karets fine, I demand of what finenesse is 1 li. waight of the same masse? Answer. You must multiply the waights (by the Karets fine) of each sort, and adde the products together, the same you must divide by the whole sum of all the waights added together, and your quotient will shew you of what finenesse the same is of, as in the former example, I doe multiply 12 li. and 5 ounces by 18 Karets, and thereof cometh 223 Karets $\frac{1}{2}$. Likewise I doe multiply 4 li. waight, 4 ounces $\frac{1}{2}$, by 21 Karets, and thereof cometh 91 Karets $\frac{7}{8}$, these two sums of Karets I doe adde together, and they make 315 Karets $\frac{3}{8}$. Then I doe adde 12 li. waight 5 ounces, and 4 li. waight 4 ounces and $\frac{1}{2}$ together, and they make 16 li. 9 ounces $\frac{1}{2}$, the which 9 ounces $\frac{1}{2}$ are $\frac{19}{24}$ parts of a pound: and therefore I divide 315 $\frac{3}{8}$ by 16 li. $\frac{19}{24}$, and thereof cometh 18 Karets, and $\frac{2520}{3224}$ remaining, which fraction is 3 graines, and $\frac{52}{403}$ parts of a graine. And of that fines is 1 li. waight of the said masse.

A Goldsmith hath melted 10 pound waight, 7 ounces, and $\frac{3}{8}$ of 20 Karets, and

$\frac{1}{3}$ fine,

[illegible] fine. And 8 lt. waight, 2 ounces and $\frac{1}{2}$ parts of 23 Karets fine, with 15 lt. waight, 1 ounce of Silver. The queſtion is, of what fineneſſe is the pound waight of the ſaid maſſe? Anſw. You muſt multiply the waight of every ſort of Gold billion by his allay, that is to ſay, by his fineneſſe, and add all the products together, and you ſhall find 405 $\frac{25}{98}$ Karets, then adde the waight of the two ſorts of Gold billion, with the waight of the Silver together, and thereof will come 33 lt. 11 ounces, $\frac{5}{24}$, the which 11 ounces $\frac{5}{24}$ is $\frac{269}{288}$ of a pound waight, then divide the ſaid 405 $\frac{25}{98}$ parts by 33 pounds $\frac{269}{288}$. and you ſhall find 10 Karets $\frac{4205}{283871}$. And of the ſame fineneſſe ſhall the pound waight of that maſſe of Gold be.

The ſecond part of the Rule of *Alligation*.

1 A Goldſmith hath 4 ſorts of gold, The firſt is worth 30 Crownes the pound waight, the ſecond is worth 36 Crownes, and the third is worth 42 Crownes, and the fourth is worth 45 Crownes, and of theſe 4 ſorts he will make a Scepter of 6 li. waight, which ſhall be worth 40 crowns the

the Pound, I demand how much he must take of every sort. Answer. First you must set down the numbers whereof you will make the alligation (which are 30, 36, 42, and 45) orderly the one under the other, after the same manner as if you would adde them together: and the common number whereunto you will reduce them, you shall set on the left hand, which common number in this example is 40. Then mark which of the said foure numbers, are lesser then that common number, and which of them be greater, and with a draught of your pen, evermore link two numbers together, so that the one be lesser then that common number, and the other greater then it, for two greater, nor two smaller numbers may not be linked together, for they will be either lesser, or else greater then the common number, but one greater number, and one smaller may bee so mixed that they will make the common number. And two greater or two smaller numbers, can never make the common number in due order, as hereafter shall appear.

After that you have thus linked them, then mark how much each of the lesser numbers is smaller then the common number, and that difference you shall set against the greater

greater numbers which bee linked with those smaller, each of them with his match still on the right hand. And likewise you must set the excesse of the greater numbers against the lesser, which be combined with them. Then shall you adde all those differences into one Summe, which shall be the first number in the Rule of three, and the second number shall be the whole massy peece that you will have of all the particulars, which in this example was presupposed to bee 6 li. Then the third sum shall be each difference by it selfe, and by them shal you find out the fourth number declaring the just portion that you shall take of every particular in that mixture, as now by the former example, I will make it more plaine.

The

---

6 8 7

8 5 6

9   9 3 1

		The prizes severall.	*The differences.*	
The common price 40 or number.		30	5	*A*
		36	2	*B*
		42	4	*C*
		45	10	*D*
			21	

21. 6. 5. || 21. 6. 2.

21. 6. 4. || 21. 6. 10.

Here in this former example, you see th
I have set downe the severall prices, whic
be 30, 26, 42, 45, and have linked togeth
30, with 45, and 36, with 42. The com
mon price 40. I have set on the left side, a
before is declared, and the difference of i
from every severall price, I have set on th
right hand, against that sum with the whic
it is linked. So the difference of 30, fro
40, is 10, which I set against 45, that he i
linked withall; & the difference of 45, abov
40 is 5, which I have set against 30. S
likewise, the difference of 42, above 40, i
2, that I have set against 36. An
the difference betweene thirty six and 40
(whic

(which is 4) I have set against 42. Then I adde all those differences together, namely 5, 2, 4, and 10, and they make 21, which I make the first number in the Rule of three, and 6 li. which is the waight of the Scepter of Gold the second number, and the third number shall be every particular difference for every severall working. Then work by the Rule of three: saying if 21 (which is all the differences added together) doe give me 6 pound waight, which is the waight of the Scepter, what shall 5 give, which is the first difference?

I multiply and divide, and I find 1 li. waight $\frac{3}{7}$, so much must I have of the first price. Then I doe in like manner with the rest, and I find $\frac{4}{7}$ of a li. waight of the second price, 1 li. $\frac{1}{7}$ of the third price: and 2 li. $\frac{6}{7}$ of the fourth; the which 4 sums being added together, doe make 6 li. which is the whole waight of the Scepter that I would have. And now to prove if the peeces doe agree, you shall doe thus: First multiply this totall summe 6 by the common price 40, and it will make 240 Crowns, which you shall keepe by it selfe. And afterward multiply every severall summe of waight by the price belonging to the same waight, and if that summe do agree with the

the first that you kept by it selfe, then is your work well done, as here 1 li. $\frac{3}{7}$, is the waight of the sort of Gold which is of 30 crowns price. Therefore multiply 30 by 1 li. $\frac{3}{7}$, and it maketh 42 crowns $\frac{6}{7}$, which you must set down. Then multiply $\frac{4}{7}$ (which is the waight of the second sort of Gold) by 36 which is the price of the same, and thereof cometh 20 crowns $\frac{4}{7}$: so againe 1 li. $\frac{1}{7}$, multiplyed by 42 Crownes, which is the third price, doth make 48 Crowns. And last of all 2 li. $\frac{6}{7}$, multiplyed by 45, maketh 128 crownes $\frac{4}{7}$. All these being added together, doth make 240 crownes agreeable to the former sum of 40. multiplyed by 6. And thus I may affirme that this work is well done.

2 A Taverner hath foure sorts of wine of 4 severall prices, the first of 8 d. the Gallond, the second of 10 pence the Gallond, the third of 15 pence, and the fourth of 18 pence. And he will mixe all these sorts together, so that the Gallond shall be worth but 12 pence. I demand how many Gallonds he must take of every sort? Answ. First suppose the punchen to hold some certain measure, as to containe 84 Gallonds, and then the forme will be after this sort, as you see hereafter following.

12	8	3
	10	6
	15	4
	18	2
		15

24 8 3 10 60 6 60 15 4 18 2

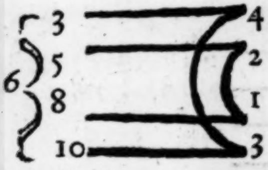
If 15 *doe give* 84.

What will 3		16 $\frac{4}{5}$	*of the first.*
What will 6	*give?*	33 $\frac{3}{5}$	*of the* 2.
What will 4	*They*	22 $\frac{2}{5}$	*of the* 3. 36
What will 2	*make*	11 $\frac{1}{5}$	*of the* 4.
		84	

3 A Mint-master hath 4 sorts of silver Billion of these finenesse following. The first is of 3 ounces fine, the second of 5 ounces fine, the third of 8 ounces fine, and the fourth of 10 ounces fine. And of all these 4 sorts, he would make another sort, that should be but of 6 ounces fine. The question is to know what portion he must take of every of the said Billions? Ans. set down the particular finenesse, the one under the other, namely 3, 5, 8, and 10, and set 6 which is the common finenesse, before them toward your left hand, as here you may see.

24 60 60 36 6 8 2 15

6



Then put the difference of 3 from 6 right against 10, and the difference of 6 from 10, which is 4, right against 3. Likewise the difference of 5 from 6 which is 1, right against 8, and the difference of 6 from 8, which is 2, right against 5. This done, you you shall conclude, that for every 4 pound waight that he taketh of the Billion of 3 ounces fine, he must take 2 li. of the Billion of 5 ounces fine, and 1 li. waight of the Billion of 8 ounces fine, and 3 li. waight of that which is of 10 ounces fine. Or else if you please adde 4, 2, 1, and 3 together and they make 10 which shall be the denominator of every of the portions, that is to say, you shall take $\frac{4}{10}$ of the Billion of 3 ounces fine $\frac{2}{10}$ of that which is of 5 ounces fine, $\frac{1}{10}$ of that of 8 ounces fine, & $\frac{3}{10}$ of that which is of 10 ounces fine. And so of all such like. And if you would make 60 li. waight of such a mixture, you must adde 4,2,1, and 3, together, which maketh 10, and then work by the rule of company, saying, if 10 li. give 60 li. what will 4 give? and so

so likewise, what will 2 give, &c. This form may be varied, by combining the particular values after this manner as here you do see, and as in the other example, it is plain.

6	3	2
	5	4
	8	3
	10	1

4 Sometimes the value doth change his difference, and is linked unto divers, for to represent the portion that is to be taken of every thing, as by example. A Merchant hath wheat of 2 s. 8 d. the bushell, Rie of 2 s. and barley of 16 d. the bushell, and he will make a mixture of these sorts which shall stand him but in 22 pence the bushell. It is demanded how much he may take of every sort of the said grain? Answ. Put the difference of 22 from 32 and 24, right against the 16. And likewise the difference of 16 from 22 right against 32 and against 24: And you shall find for 6 bushels that he taketh of wheat, he must take 6 bushels of Rie, and 12 bushels of Barley.

$$22\begin{cases}32 \text{———————} 6 \\ 24 \text{———————} 6 \\ \underline{} \\ 16 \text{———————} 10, \text{or } 2, \text{or } 12.\end{cases}$$

(d. above 32)

5 A Mint-master hath Billion of 9 ounces 10 penny waight fine, and of the same he would make mony, which should be but of 6 ounces fine, and therefore it behoveth him to melt copper therewith, which is valued at o penny waight of fine. The question is to know how much silver and copper he must mixe together? After that you have put down 9 ounce, ½ for the value of the silver, and right under the same o for the copper, you must take the difference of 6 from 9 ½ which is 3 ½, and place the same sum right against the o, for to signifie the portion of copper that he must take: And the difference of o from 6 is 6: the same you must set right against 9 ½, which shall represent the portion of silver that he must take. And thus you see, that for 6 li. of silver that he taketh he must take 3 li. ½ of copper to make the said mony of 6 ounces fine.

$$6\begin{cases}9\tfrac{1}{2} \\ 0\end{cases}\begin{cases}6 \text{ li. sil.} \\ 3 \text{ li. } \tfrac{1}{2} \text{ cop.}\end{cases}$$

And

And if he had 3 sorts of Silver Billion, that is to say, of 6 ounces fine, of 7 ounces fine, and of 9 ounces fine, and he would make mony thereof which should bee but of 5 ounces fine, it behoveth him to mixe copper therewith. And this forme following doth shew how the same must be combined, and likewise how much he must take of every sort.

5	6	5
	7	5
	9	5
	0	1, 2, 4, all is 7.

6 Likewise, a Mint-master hath Billion of Gold, at 19 Karets fine, some at 22 Karets fine, some at 24 Karets which is full fine without corruption, and he will make coyne thereof, which shall be 23 Karets fine, it is demanded how much he must take of every sort? Answ. make your Alligation as this form here under sheweth.

23	19	1
	22	1
	24	4, 1, all is 5.

More, the said Master hath Gold of 20 Karets ½ fine, and of 22 Karets fine, and he will allay the same to 18 Karets fine. And

for to doe the ſame, it is conuenient for him to mixe ſilver therewith, which is eſteemed at 0 Karets fine, but proceeding according to this Rule, he ſhall find that for 18 pound waight, or other portions that he taketh of the 2 ſorts of Billion of Gold, he muſt take 6 li. waight, and $\frac{1}{2}$ of Silver to allay the ſame unto 18 Karets fine.

$$
18 \left\{ \begin{array}{l} 20\frac{1}{2} \text{ ———— } 18 \\ 22 \text{ ———— } 18 \\ 0 \text{ ———— } 2\frac{1}{2}\ 4, \text{ that is } 6\frac{1}{2} \end{array} \right.
$$

7 Again the ſaid Maſter hath 100 li. waight of Gold at 22 Karets fine, and 20 pound waight at 19 Karets fine, the which he will allay to 20 Karets fine. The queſtion is whether he ought to mixe any ſilver with the ſame, yea or no, and how much? Anſw. You muſt conſider (by the firſt part of the rule of Alligation) the allay of the 100 li. and of the 20 li. being melted together, and you ſhall find that the ſame is of 21$\frac{1}{2}$ Karets fine, and therefore foraſmuch as the ſame is yet of a better fineneſſe then he would have it, he muſt therefore mixe ſilver therewith, that is to ſay, for 20 pound waight, or portions of Gold he muſt take thereto 1 li. $\frac{1}{2}$ of Silver.

$$22\left\{\begin{array}{l} 21\frac{1}{3} \end{array}\right. \quad \begin{array}{l} 20 \\ \\ 1\frac{1}{2} \end{array}$$

8 If he had 1 li. waight fine silver of 12 Ounces fine, I demand how much Copper he must mixe with the same, to allay it unto 11 ounces $\frac{1}{4}$ fine, that is to say, to 11 oun. 5 d. waight fine? Make your Alligation as before is taught. Then divide the portion of copper, by the portion of fine, & you shall find $\frac{3}{45}$, which being abbreviated, is $\frac{1}{15}$. And thus to every li. waight of silver, you must take $\frac{1}{15}$ of a li. of copper, and for every 11 pound $\frac{1}{4}$ of silver, you must take $\frac{3}{4}$ of a li. of copper. And so is to be done with the same, in case that it were of any other allay.

9 A Master hath 1 li. of fine Gold of 24 Karets fine, the which he would allay to 22 Karets fine. The question is, to know how much silver must be mixed with the same, that it may be of the finenesse of 22 Karets as before? Answer. Take the difference of 22 to 24, which is 2, then divide 2 by 22, which you cannot, for they are $\frac{2}{22}$, but abbreviate them, and it is $\frac{1}{11}$. And so much silver must be mixed with 1 li. waight of fine gold that the same may be of 22 Karets fine.

10 A Goldsmith hath 1 li. waight of Silver Billion of 7 ounces fine, it is demanded how much fine silver he must put to the same, that being molten together, it may be of 10 ounces fine. Answ. make your alligation of 7, and 12 unto 10, and then divide the portion of the fine silver, by the portion of silver Billion, and you shall find 1 $\frac{1}{2}$: and thus to 1 li. waight of 7 ounces fine, you must take 1 li. $\frac{1}{2}$ of fine silver of 12 ounc. fine to make the same of 10 ounc. fine.

11 A Merchant hath given order unto his Factor to employ him 83 li. 6 s. 8 d. ster. in 5 sorts of spices, that is to say, in Nutmegs of 80 d. the pound, Cloves at 76 d. the pound, Cinamon at 52 d. the pound, Ginger at 34 d. the pound, and Peper at 30 d. the pound. But he hath not appointed him the quantity or portion which he should buy of every sort, neither yet of all the sorts together: the question is to know how much the Factor must buy of every sort to have of each the like quantity. Ans. you must add 80, 76, 52, 34, & 30, together, & they make 272. Then must you divide 83 li. 6 s. 8 d. being reduced into pence, namely 20000 d. by 272, and thereof cometh 73 li. $\frac{9}{17}$, and so many pounds must he buy of every sort of the said spices.

12 But

12 But in case hee would not have so many pounds of the one sort, as hee would have of the other, then you must take another middle value betweene the said particulars: as for example, let the meane number bee 50 d. Then reduce the said 83 li. 6 s. 8 d. into pence as the other prices are, and they doe make 20000 pence, the same you must divide by 50 pence, which is the meane or common price, and thereof will come 400 li. And so many Pounds must he have of all the sorts together. Then if you will know how many Pounds he must have of every sort, you must set down your particular prices, after the middle value, that is to say, after 50 d. as hereafter followeth: And then work by the Rule of company, and you shall find how much he shall buy of every sort.

	80	20
	76	16
50	52	16
	34	26 & 2, all is 28
	30	30
		110

110 give 400, what
- 20? *Ans.* 72 $\frac{8}{11}$
- 16? *Ans.* 58 $\frac{2}{11}$
- 16? *Ans.* 58 $\frac{2}{11}$
- 28? *Ans.* 101 $\frac{9}{11}$
- 30? *Ans.* 109 $\frac{1}{11}$

400

Chap. 14.

Of the Rule of Falshood, or false *Positions.*

The Rule of falshood is so named not for that it teacheth any deceit or falsehood, but that by fained numbers taken at all adventures, it teacheth to find out the true number that is demanded. And this (of all the vulgar rules which are in practise) is the most excellent: This Rule hath two parts, the one is of one false position alone, the other is of two positions, as hereafter shall appeare.

Those

Those questions which are done by false positions, have their operations, in a manner like unto that of the rule of three: but only that in the rule of three, we have three numbers known, and here in this Rule, we have but 1 number that cometh in use to work by: unto the likenesse whereof, we must devise two other numbers, the one multiplying, and the other dividing, as by example.

1 I have delivered to a banket, a certain sum of pounds in mony, to have of him by the year simply 6 li. upon the 100 li. And at the end of 10 yeeres, hee paid me 500 pound for all, both principall and gaine. I demand how much was the principall sum that I delivered him at the first? Here you see that there are divers terms: but the chiefe to work withall is 500 li. which cometh of the other numbers, that is to say, of 10, and 100, for of them is composed or made the tenor of the question, the practise whereof is thus.

Let us fain a number at pleasure, and with the same let us make our discourse, even as though it were the principall sum that we seek for. As by example. Suppose that I delivered him at the first 200 li. the which were worth to mee in tenne

yeares

yeares 120 li. after the rate of 6 li. upon the 100 li. Then 120 li. added with 200 li. doe make but 320 li. and I must have 500 li. Thus you see that I have three termes of the rule of Three: the one which shall containe the Question, the other two which I have formed artificially, which are 200 and 320: in such sort, that 320 ought to have such proportion to 200, as 500 hath unto the number that I seeke: that is to say, unto the true principall summe, then must I have recourse unto the Rule of three, after this sort, saying: If 320 li. become of 200 li. of how much shall come 500 li. I doe multiply 500 by 200, and they are 10000, the which I must divide by 320 li. and thereof commeth 312 li. $\frac{1}{2}$, which is the sum that I delivered at the first. And thus this rule hath some congruence with the double rule of three.

2 I have a Cisterne with 3 unequall cocks, containing 60 pipes of water: And if the greatest cock be opened, that water will void cleane in one hower, at the second it will avoid in two howers, and at the third it will require three howers: now I demand in what space it will avoid, all the cocks being set open? Answer. Suppose that it will avoid in halfe an hower: that is

as to ſay, in 30 minutes. Then muſt there avoide at the firſt cock the $\frac{1}{3}$ which is 30 pipes: and by the ſecond cock the $\frac{1}{4}$, which is 15 pipes, and by the third cock the $\frac{1}{6}$, that is 10 pipes: all the which ſummes being added together, doe make 55 pipes: but it ſhould be 60 pipes. Therefore ſay by the Rule of Three, if 55 pipes doe void in 30 minuts: in how many minuts will 60 pipes void? Multiply & divide, and you ſhal find 32 minutes $\frac{40}{55}$, the which $\frac{40}{55}$ being abbrevied $\frac{1}{11}$ of a minut, and in that ſpace will the water void, if all the cocks be ſet open.

Of the Rule of two falſe Poſitions.

The ſumme of this Rule of Two falſe poſitions is thus, when any queſtion is propoſed appertaining to this Rule, firſt you muſt imagine any number at your pleaſure, which you ſhall name the firſt poſition, and with the ſame you ſhall worke in ſtead of the true number, as the queſtion doth import: and if you ſee that you have miſſed of the true number that you do ſeeke; then is the laſt number of the work, either too great or too little; the which number, you ſhall note with the ſigne of more or leſſe, for that is the firſt error, in the which you

you have failed, the which signes of more, and lesse, shall be noted with these figures X, ——, This figure X, betokeneth more: and this plaine line ——, signifieth lesse: that is to say, the one signifieth too much, and the other too little: then you must begin againe, and take another number, which shall be the second position, and work by the question as before: if you have failed againe, note the excesse or want, for that is the second error. Then shall you multiply the first position by the second error crosse-wise, and againe the second position by the first error (and this must alwaies be observed) and you must keepe the two products: then if the signs be both alike, that is to say, either both too much, or both too litle, you shall abate the lesser product from the greater, and likewise you shall substract the lesser error from the greater, and by the remaine of those errors, you shall divide the residue of the products, the quotient shall be the true number that you seeke. But if the 2 signes be unlike, that is to say, the one too much, and the other too little, then you shall adde those products together, and likewise you must adde both the errors together, and by the Sum of those errors, divide the totall sum of both the products: the quotient shall

shall be the true number that you doe seeke and this is the whole Rule, as by these examples following, it will appeare more plaine.

Example.

3 A Man lying at the point of death said that he had in a certaine Coffer 100 Duckets, the which he bequeathed to 3 of his friends by him named, after this sort. The first must have a certaine portion. The second must have twice so many as the first abating 8 Duckets: and the third must have three times so many as the first lesse by 15 Duckets. Now I demand how many every of them must have? Answer. First I doe imagine that the first man had 30 Duckets, then by the order of the question, the second should have 52, and the third 75. These three Summes being added together doe make 157, and I should have but 100, so that this first error is to much by 57, then I note apart the first position 30, with his error 57 too much after this sort 30, X 57. Therefore I prosecute my work, & I suppose that the first had 24, then by the order of the question, the second should have 40, and the third 57: these three summes being added together, doe make 121, and I must have but 100, so the second error is too much by

by 21. Therefore I note 24, X 21, under the 30 X 57, which was my firſt poſition with the error as you may ſee in the Example following.

Then I multiply croſſewiſe, 30, (which is the firſt poſition) by 21 which is the ſecond error, and thereof commeth 630. Likewiſe I multiply 24, (which is the ſecond poſition) by 57, which is the firſt error, and I find 1368: Then becauſe the ſignes of the errors are both like, that is to ſay both too much, I muſt therefore ſubſtract 630 from 1368 and there wil remain 738 which is the dividend.

630.

30. X 57.

24. X 21.

1368. 36.

630.

738.

11
738
366.(20 $\frac{1}{2}$.
3

20 $\frac{1}{2}$.
33.
46. $\frac{1}{2}$.
100.

Againe I muſt ſubſtract the leſſer error from the greater, that is to ſay, 21, out of 57, and there will remaine 36, which ſhall be my diviſor. This done I divide 738, by 36, and the quotient will be 20, $\frac{1}{2}$.

The

The which $20\frac{1}{2}$, is the juſt number of the Duckets, that the firſt man had for his part, ſo conſequently the ſecond man had 33 Duckets, and the third $46\frac{1}{2}$, as by the working before may appeare.

The like number will alſo appeare in caſe the errors were both too little, as in making the two poſitions by 18 and 20, and you ſhall finde that the two errors will be both too little, the firſt will be too little by 15, and the ſecond too little by three, as by peruſing this worke, you ſhal well perceive.

54.
18.−15
20−−3.
300. 12
54.
240. | 246 ($20\frac{1}{2}$.
122
1

Againe, if one of the errors were too much, and the other too little, yet you ſhall have the true number, as before. As if, the two poſitions were 24, and 20, you ſhall finde that the firſt error will be 21 too much, and the ſecond will be 3 too little. Therefore multiply 24 by 3 croſſewiſe, thereof commeth 72.

Likewiſe multiply 20 by 21, the product will be 420. Theſe two ſummes 72 and

420,

420, you shal add together, for because the signes of the errors be unlike, and they make 492, the which shall bee your dividend, & againe, adde the lesser error 3, with the greater error 21, & they make 24. for your divisor, then divide 492 by 24, the quotient will be $20\frac{1}{2}$: as before doth plainely appeare.

```
 72
-
 24 X 21
    X
 20 — 3
----------------
 420     24
  72
-----------
 492          | 1
              | 492
              | 244
              | 2
```

And now because you shall not forget this part of the Rule, learne this briefe remembrance following.

The signs both like, Substraction doth require;
And unlike signes, Addition will desire.

The meaning whereof is thus, if both the errors have like signes, then must the Dividend and the Divisor be made by substraction as is taught before, and if those signes be unlike, then must you by addition gather the dividend, and the divisor, as I have done in this last example.

Ano-

Another Example.

4 A man hath two silver Cuppes of unequall waight, having to them both but one cover, the waight whereof is 5 ounc. if the cover be put to the lesser cuppe, it will be in double proportion unto the waight of the greater, and the cover being put to the greater cuppe, it will be in triple proportion unto the waight of the lesser. I demand what was the waight of every cup? Answer. Suppose that the lesser cuppe did waigh 7 ounces, then with the cover it must waigh 12 ounces, and this waight should be in double proportion unto the greater, therefore the greatest must waigh but 6 Ounces, adde unto it 5 ounces for the cover, all will be, 11 ounc. but it should be 21, for to have it in triple proportion unto 7, which represents ÿ waight of the lesser cup:

105

7 — 10

9 — 15

90 5

105

90 ~~15~~ (3 ounces.

15 | 8

So that this first error is too little by 10, which you shall note after 7 in this sort, 7, — 10.

After you shall suppose some other number, as 9, and make the like worke as before, so you shall find 15 too little for the second error, which you shall put behind 9 with the signe lesse thus — 15, and then worke with the rest as above is said, and you shall find that the lesser Cup waighed three ounces, and consequently the greater foure Ounces.

5 One man demanded of another in a morning what a clock it was, the other made him this answer, if you doe adde (saith he) the $\frac{1}{4}$ of the houres which be past since midnight with the $\frac{2}{3}$ of the houres which are to come untill noone, you shall have the just houre, that is to say, you shall know what a clock it was. Answ. Suppose that it was 4 a clock in the Morning, so should there remaine 8, untill noone, then I take the $\frac{1}{4}$ of 4 which is 1, and the $\frac{2}{3}$ of 8 which is $5\frac{1}{3}$ and I adde them together, so I find $6\frac{1}{3}$, and I supposed but 4 therefore this first error is too much by $2\frac{1}{3}$, which I note after my position, thus $4 \times 2\frac{1}{3}$: then againe I suppose another number, that is to say 9, so should remaine but 3 houres untill noone. I take the $\frac{1}{4}$ of 9, and the $\frac{2}{3}$ of 3, which is $2\frac{1}{4}$ and 2: these I add together, and they make $4\frac{1}{4}$: but I supposed that ~~it was~~ 9, therefore the

the second error is $4\frac{3}{4}$ too little, which I note behind my position thus: $9 - 4\frac{3}{4}$.

And then I multiply crosse-wise, as before is taught, & because the signes of the errors are unlike, that is to say, the one too much, and the other too little, therefore in this worke I must adde the products, and they will be 40.

$$\begin{array}{l} 19. \\ \hline 4 \times 2\frac{1}{3}. \\ \quad \times \\ 9 - 4\frac{3}{4}. \\ \hline 21. \quad 7\frac{1}{12}. \\ 19. \\ \hline 40. \end{array}$$

Likewise I must adde the errors and they be $7\frac{1}{12}$. Then I divide 40 by $7\frac{1}{12}$, and thereof commeth 5 houres $\frac{11}{17}$, and that houre it was in the morning.

Chap. 15.

Of divers Questions extraordinarie, every one of them containing a generall Rule for such like *Examples.*

Five men divising of their ages, The first said to the others, that he was 20 yeares of age: the 2 said, if my yeares were doubled then should I have so many yeares more then the first man, as the

first hath now more then I have: The third said in like manner, if my yeares were tripled. The fourth said if my yeares were quadrupled, that is to say, multiplyed by 4: The fift said that if his yeares were quintupled, that is to say, multiplied by 5, that they should each of them have so many yeares more then the first man as he hath now more then every one of them. The question is to know, how old every one of the other 4 men were?

Answer. You must take the numbers which are nearest collaterals, in naturall order unto 2, 3, 4, and 5 by reason of dupling, tripling, &c. And the greater of every of the said numbers collaterals, must be your denominator to the lesser number. As thus, the next collaterall numbers unto 2, are 1, and 3, which is $\frac{1}{3}$. Likewise the next collaterall numbers to 3 are 2 and 4, which is $\frac{2}{4}$. And so for 4, are 3 and 5, which are $\frac{3}{5}$, and for 5 are 4, and 6 which be $\frac{4}{5}$. Then if you will know the second mans age, you must adde unto 120 the $\frac{1}{3}$ of it selfe which is 40, all is 160, the same you must divide by 2, and thereof commeth 80 yeares, and so old was the second man. And for to know the age of the third man, you must adde unto 120 his own $\frac{2}{4}$ that is to

to ſay, his $\frac{1}{2}$, which is 60, and they make 180. The ſaid ſumme you muſt divide by 3, and thereof commeth 60 yeares for the third mans age. And after the ſame manner, you ſhall find that the fourth man had 48 yeares, and the fift had 40 yeares. The proofe is very eaſie.

2 A man having his eye-ſight ſomewhat altered, began to tell and reckon a certaine number of birds to be in all 18. His Companion that had a clearer ſight, beholding well the birds: Anſwered him that there were not 18. But ſaid he, if there were twiſe ſo many more as there are, there ſhould be as many more above 18, as there are now leſſe then 18. The queſtion is to know, how many birds there were in all? Anſ. You muſt adde unto 18 his $\frac{2}{4}$, that is to ſay his $\frac{1}{2}$, and thereof will come 27, the which you ſhall divide by 3, and thereof commeth 9. And ſo many birds there were in all.

3 A Draper hath bought 24 ſorting cloathes, and he hath ſold 100 pounds worth of the ſame cloaths, upon the which he hath gained, as much as 1 Cloth did coſt him. I demand what 1 of the ſaid cloathes did coſt him? Anſwer. You muſt add 1 unto 24, and they make 25. Then divide 100 by 25, and thereof will come

4 li. and so much did one cloth cost him.

4 A Mayd carried egges unto the Market, and it happened a merry fellow to meet her, who began to jest with her in such sort, that he overthrew her Basket, and brake all her egges, the Maid being much displeased with him for breaking of the same, said very earnestly unto him, that he should pay for them: the man considering with himselfe, that by his folly they were broken, answered the maid that hee would pay her for them, and therefore he demanded of her what number she had? The silly poor wench that could not well reckon, said unto him, that she could not well tell him, but said shee, when I did put them into my Basket by 2 and by 2, there reremained 1 egge: and when I counted them by 3 and by 3, there remained 1: and when I did reckon them by 4 and by 4, there remained still 1: but when I did count them by 5 and by 5, there remained none. The question is to know how may egges the maid had in all? Answer. For to doe this, and all such like questions, you must multiply 2, 3, and 4, together: saying 2 times 3 make 6, and 6 times 4 make 24, unto this number you must adde 1, and they make 25. And so many egges she had in all. But if

shee

she had had a greater number of egs that she might have counted them till shee came to 7 and 7, after the same manner as she did, till she came to 5 and 5, you must multiply these numbers 2, 3, 4, 5, and 6, the one by the other, and thereof will come 720, unto the which adde 1, and they make 721. And so many egges shee should have had, if she had counted them by 7 and 7.

5 Again, if she had said, that when she counted her egges by 2, and by 2 there remained 1, and by 3 and 3, there remained 2, and by 4 and 4, there remained 3, and by 5 and 5, there remained nothing. The question is to know, how many egges shee should have had? Ans. You must find a number the least that you can possible, which may bee divided by 2, by 3, and by 4, that is to say, 12 is the nearest number, divide the same by 5, and there remaineth 2. This being done you must find two numbers the least that, is possible, which may bee divided by 5, and by two, in such sort that the number which is divided by two may exceed (the other that is divided by 5) only by 1, and those 2 numbers are 10, and 6, for if you divide 6 by 2, your quotient will be 3, and 10 divided by 5, bringeth but 2:

 then

then consider, that 6 containeth 3 times 2, and therefore you must multiply 12 by 3, and they make 36, from the which you must substract 1, and there will remaine 35, which is the number that is required to be found.

6 And if shee had counted them after the same manner unto 7, and that there had remained nothing; then you know that 60 is the nearest number that may be divided by 2, 3, 4, 5, and 6, the which 60 being divided by 7 there will remain 4, and therefore you must find 2 numbers the least that may be, that can be divided by 4, and by 7, in such sort, that that number which is divided by 4, may exceed the other number (by 1,) that is divided by 7, the which 2 numbers are 7, and 8, for if you divide 8 by 4, your quotient will be 2. And dividing 7 by 7, your quotient will be 1, & therefore for because that containeth 2 times 4, you must multiply 60 by 2, and thereof cometh 120, from the which number you shall substract 1, and the residue which are 119, is the number that is required.

7 A Theef entring into a Garden, did steale from thence a certaine number of Apples: And at his coming forth, hee did meet with three men, one after another

another, who threatned to accuse him: and for to appease them, he gave unto the first the $\frac{1}{2}$ of all his apples, who received the same with thanks, but he returned him 12 of them back again. Then he gave unto the second the $\frac{1}{2}$ of them that he had remaining, who received the same, but he gave him back againe 7 apples: & so he gave unto the third man, the $\frac{1}{2}$ of the residue, who returned him 4. And in the end he had still remaining 20 apples. The question is to know, how many apples he gathered in the said Garden? Answ. For to doe this, you shall substract 4 from 20, and there will remain 16, the same you shall double, and they make 32: from the which you must abate 7, and there will remaine 25: the same you shall double, and they make 50: from the which you shall substract 12. and there will remaine 38, whereof the double which is 76, doth shew the number of apples that he gathered. This and such like questions are easie to bee done in going backwards from the end of the question until you come to the beginning thereof. But if hee had given the $\frac{1}{3}$ unto one of them, the $\frac{1}{3}$ unto another, and $\frac{1}{4}$ unto the last, or any other, all the same may be done by the Converse rule, that is to say, begin-

beginning at the end of the question, till you come to the beginning as before is said.

8 A Merchant did ride unto three severall Faires: at the first he doubled his money and spent 10 Crownes: at the second Faire hee did also double his money and spent 10 Crownes: And likewise at the third Faire, he did double his mony and spent 10 Crownes, and in the end, he found that he had remaining but 2 Crownes. The question is to know, how many Crownes he had at the first? Answ. for to doe this, you must adde unto 10 Crownes, the two Crownes which he had remaining, and they make 12, whereof you shal take the $\frac{1}{2}$ which is 6: again add 6 unto 10, and they make 16, whereof you shall take the $\frac{1}{2}$, which is 8: finally, you shall adde 8 unto 10, and they make 18, whereof you must take the $\frac{1}{2}$ which is 9: and so he had 9 Crowns at the first.

9 A Burgesse would distribute a certain sum of pence unto divers poore men equally: but after that hee had counted how many there were in number, he perceived that if he should give unto every man 6 pence, he should want 14 pence: But if he should give every man 5 d. the peece, hee should have 9 pence remaining.

The

The question is to know the number of the poore men. Answ. For to doe this, and such like questions, you must have in remembrance this principle, more from more, or lesse from lesse, &c. which is set out in 2 verses in the Rule of false positions, that is to say, you must adde the lesse with the more. Namely, 14 with 9, and they make 23: and divide the same sum by the difference which is of 5 from 6 that is 1. And therefore you must divide 23 by 1, but 1 doth neither multiply nor divide, therefore you may conclude, and say that there were 23 poore men.

10 And if he should give to every man 5 pence, he should have 19 pence remaining, and giving every man 7 d. he should have 3 pence over: In this case you must abate more from more, that is to say, 3 from 19 and the rest which is 16, you must divide by 2 which is the difference of 5 from 7: and the quotient which is 8, doth shew you the number of the poor men: and likewise if that he had had both wants, that is, if both the numbers had bin too litle, you must have done with them as you did with the others that were both more.

11 A man hath given unto 20 workfolks 20 shillings, that is to say, unto men, women,

women, and boyes: unto men hee gave 20 pence a peece, unto women 15 d. and unto boyes he gave 8 pence. The queſtion is to know, how many men, how many women, and how many boyes there were in all? Anſw. Firſt you muſt take the difference of 8 from 15, and alſo from 20: and you ſhall have 7 for the difference of the woman, and 12 for that of the man: this done, you may ſuppoſe that there were 20 boyes, the which at 8 pence the peece maketh 160: the which you muſt abate from 20 s. being reduced into pence, that is, from 240 pence, and there will remain 80 pence, the which 80 you ſhall divide into 2 ſuch parts that the one may be divided by 7, and the other by 12, and that nothing may remain after the diviſions are made. The which 2 numbers are 56, and 24: For 56 being divided by 7, bringeth into the quotient 8, and 24 being divided by 12, will bring into the quotient 2: which ſheweth that there was 8 women, 2 men, and the reſt of the 20, which are 10, were boyes, ſo there were 8 women, 2 men, and 10 boyes. Some men doe call this Rule, the Virgins Rule.

Chap. 16.

Of ſports and paſtime, done by *Number*.

If you would know that number that any man doth think, or imagine in his mind as though you could divine;

Bid him triple the ſame number, then of the product let him take the $\frac{1}{2}$, if the number be even, or elſe the greater halfe, if the ſame be odde, then bid him triple againe the ſaid $\frac{1}{2}$: after ſay to him, that he ſhall put away if he can 36, 27, or 9, from the laſt number being tripled: that is to ſay, cauſe him ſubtilly to put away 9, as many times as is poſſible, and keep the number ſecretly: and when he can no more take away 9: then to know if that yet there remaine any number, bid him abate 3, 2, or 1, if he can: this done, ſee how many times 9 you have cauſed him to abate, for the which keep you in mind ſo many times 2, and if that you know that he had any thing remaining beſides the nines, the ſame ſhall alſo note unto you 1.

Example.

Suppose that hee thought 6 which being tripled is 18, whereof the ½ is 9, the triple of that is 27: now cause him to abate 18, or 9, or 27: and againe 9, but then he will say unto you that he cannot, bid him then abate 3, or 2 or 1, he will say also that he cannot, wherefore considering that you have made him to abate 3 times 9 justly, you shall tell him that he thought 6, for 3 times 2 maketh 6. If he had thought 5 the triple thereof is 15 whereof the greater ½ is 8, the triple of that maketh 24 which containeth 2 times 9, they are worth 4, and the remaine signifieth 1, the which added together make 5 which is the number that he thought. 2. If in any company, one of them hath a Ring upon his finger, and you would know by manner of divining who hath the same, and upon what finger and what joynt: cause the persons to sit down in order, and keep likewise an order of three fingers: then separate your selfe from them in some certain place, and say unto one of the lookers on, that he double the number (marking well in your mind the order) of him that hath the Ring: and unto the double bid him adde 5, and then cause him to multiply this addition by 5, and

and unto the product bid him adde the number of the finger of the person which hath the Ring: Suppose that the same last sum did amount to 89, then afterward say to him, that hee put after the same last number toward his right hand, a figure signifying upon which of the joynts he hath the Ring, as if it be upon the third joynt, let him put 3 after 89, and it will be 893, this done you shall aske him what number he keepeth, from the which you shall abate 250, and you shall have three figures remaining at the least. The first toward your left hand shal signify the number of the person which hath the Ring. The second or middle figure shall represent the number of the finger. And the last figure toward your right hand, shall betoken the number of the joynt. As if the number which he did keep were 883, from that you shall abate 250, and there will remain 643, which do note unto you, that the first person hath the Ring upon the 4 finger, and upon his third joynt.

But note that when you have made your substraction, if there doe remaine a Cipher in the place of tens, that is to say, in the second place, you must then abate 1 from that figure which is in the

place

place of hundreds, that is to say, from the figure which is next your left hand, and that shall be worth 10 tenths, signifying the tenth finger: as if there should remain 703, you must say, that the first person (upon his tenth finger, and upon his third joynt) hath the Ring.

3 And after the same manner, if a man doe cast three dice, you may know the points of every one of them, for if you doe cause him to double the points of one dye, and unto the double to adde 5, and the same Sum to multiply by 5, and unto the product adde the points of one of the other dice, and behind that number toward the right hand, to put the figure which signifieth the points of the last dye, and then shall you aske him what number he keepeth, from the which abate 250, and there will remain 3 figures: which doe note unto you the points of every dye.

4 Likewise, if three of your companions, to say, Peter, James, and John, would (in your absence) give themselves every one a contrary name: as for example: Peter would be called a King, James a Duke, and John a County: And you would divine which of them is called a King, which the Duke, and which the County. Take 24 stones, or other peeces

peeces whatsoever & give unto Peter 1, unto James 2, and unto John 3, or otherwise. But mark well unto which of them you have given 1, unto which 2, & unto whom 3. Then leaving the 18 stones (before them) that are remaining, you shall absent your selfe from their sight, or else turn your face from them, saying thus unto them: whosoever nameth himselfe a King, for every stone that I gave him, let him take 1 of the residue; and he that nameth himselfe a Duke, for every stone that I gave him, let him take 2 of them that remaine; and he that calleth himselfe a County, for every stone that I gave him, let him take 4: this being done, approach near them, and mark how many stones are remaining: and know this, that there cannot remain any other number, but one of the six, 1, 2, 3, 5, 6, 7, for the which six numbers we have chosen to every of them a severall name which are these: *Angeli, Beati, Taliter, Messias, Israel, Pietas*: each of them containing three vowels a, e, i, which doe shew the names by order: That is to say, the vowell a

ſheweth which is the King, the vowell e, telleth which is the Duke, and the vowell i, ſheweth which is the County: in following the order how, and to whom you have given one ſtone, to whom 2, and to which 3, then if there doe remain but one ſtone, the firſt name *Angeli*, (by theſe 3 vowels, a, e, i,) ſheweth that Peter is King, James the Duke, and John County. And if there doe remain 2 ſtones, the ſecond name *Beati*, ſhall ſhew you by theſe 3 vowels, a, e, i, that Peter is the Duke, James the King, and John the County. And ſo of the other, as by this Table doth plainly appeare.

1	2	1	2	3	3
2	1	3	3	1	2
3	3	2	1	2	1
a	e	a	e	i	i
e	a	i	i	a	e
i	i	e	a	e	a
1	2	3	5	6	7
A	*B*	*T*	*M*	*I*	*P*

FINIS.

In the ensuing tables, the figures towards the left hand of the line do shew the number of Elles, Aulnes, Vares, Braces, or Paulms, which are equall to the 100 Elles, Aulnes, Vares, Braces, or Paulms of the place named, over the head of the Table: And the figures to the right hand of the line doe shew the fractionary part, and so are all numerators of Fractions, whose common denominator is 1000. So that in this decimall way of accompt 750 is 3 quarters of an Ell, Auln, Vare &c. 500 is halfe an Ell, 250 is a quarter, and 175 is halfe a quarter &c.

Example; at Lions the 100 Aulnes makes at Antwerp 163 Elles and 934 parts of an Ell divided into 1000 parts, subtract from 934, 750, which is 3 quarters, and the remain 184 which is lesse then a quarter; therefore take from it 175 which is halfe a quarter, and there remaines 009 as much as nothing: therefore the 100 Aulnes at Lions makes at Antwerp 163 Elles 3 quarters, and halfe quarter the like of any other.

As in the ensuing Tables the Ell is divided into 1000, so the pound is divided into the like parts, and therefore 750 in the Fraction is 3 quarters of a pound or 12 ounces, 500 is halfe a pound or 8 ounces, 250 is a quarter or 4 ounces, and 175 is halfe a quarter or 2 ounces: But the way to value these equall fractions into ounces is by multiplying the numerator of the fraction by 16, and cut off 3 figures to the right hand, that which remaines to the left hand is ounc. Example, 100 li. of Lions makes at Antwerp 90 li. 823 parts of a pound which 823 multiplyed by 16 the product is 13.168, from which cut off three figures to the right hand; there remaines 13 ounces: Or seek the number 823 (or the nearest to it, lesse if it cannot be found) and against it to the right hand you shall find 13 ounces as before, and the like of any other number.

15	937.5
14	875.0
13	812.5
12	750.0
11	687.5
10	625.0
9	562.5
8	500.0
7	437.5
6	375.0
5	312.5
4	250.0
3	187.5
2	125.0
1	62.5

The

The Agreement of the Measures and Waights of divers countries, the one with the other, being reduced to an equality, and drawn into Tables as followeth.

London.

100 Els at London doe make at	Antwerp,	166	667	Elles.
	Nuremberg,	174	167	
	Frankford,	208	333	
	Dantzick,	138	333	
	Vienna,	145	000	
	Arras,	165		
	Lions,	191	667	Aulnes.
	Paris,	95	000	
	Roan,	86	667	
	Sivill,	135	000	Vares.
	The Iles of Maderes,	103	333	
	Venice,	180	000	Braces.
	Lucques,	200	000	
	Florence,	204	167	
	Millan,	230	000	
	Genoa.	480	833	Paulms

The *Vares* of *Lisbbourn* is equall to the Ell of *London.*

Antwerp.

100 Els at Antwerp do make at

London,	60	Elles,
Nuremberg,	104	500
Franckford,	125	000
Dantzick,	83	000
Vienna,	87	200
Arras,	99	000
Lions,	61	Aulnes.
Paris,	57	000
Roan,	52	
Sivill,	81	Vares.
The Iles,	62	
Venice,	108	Braces.
Lucques,	120	
Florence,	122	5
Millan,	138	
Genoa.	288	5. Paulmes.

Nuremberg.

Nuremberg.

100 Els at Nuremberg do make at	London,	57	416	Elles.
	Antwerp,	95	694	
	Franckford,	119	617	
	Dantzick,	79	414	
	Vienna,	83	253	
	Arras,	94	736	
	Lions,	58	373	Aulnes.
	Paris,	54	545	
	Roan,	49	760	
	Sivill,	77	506	Vares.
	The Iles,	59	330	
	Venice,	103	292	Braces.
	Lucques,	114	832	
	Florence,	117	225	
	Millan,	132	057	
	Genoa.	276	076	Paulms.

Franckford.

One hundred Elles at Franck-ford doe make at

London,	48	000 Elles.
Antwerp,	80	000
Nuremberg,	83	648
Dantzick,	64	400
Vienna,	69	600
Arras,	79	200
Lions,	48	8 Aulnes.
Paris,	45	600
Roan,	41	600
Sivill,	64	8 Vares.
The Iles,	49	600
Venice,	86	4 Braces.
Lucques,	96	000
Florence,	98	000
Millan,	110	440
Genoa,	230	8 Paulmes.

The Ell at *Liebsig* and *Preslau* is equall unto the Ell at *Franckford*.

Dantzick.

Dantzick.

100 Els at Dantzick doe make at	London,	72	289	Elles.
	Antwerp,	120	482	
	Nuremberg.	125	903	
	Franckford,	150	602	
	Vienna,	104	819	
	Arras,	112	048	
	Lions,	73	494	Aulnes.
	Paris,	68	602	
	Roan,	62	650	
	Sivill,	97	590	Vares.
	The Iles,	74	699	
	Venice,	130	120	Braces.
	Lucques,	144	578	
	Florence,	147	590	
	Millan,	166	265	
	Genoa,	347	590	Paulms

Vienna.

Vienna.

100 Els at Viena doe make at	London,	68	965	Elles.
	Antwerp,	114	942	
	Nuremberg,	120	114	
	Franckford,	143	678	
	Dantzick,	95	402	
	Arras,	113	793	
	Lions,	70	011	Aulnes.
	Paris,	65	517	
	Roan,	59	765	
	Sivill,	93	103	Vares.
	The Iles,	71	264	
	Venice,	124	138	Braces.
	Lucques,	137	930	
	Florence,	140	108	
	Millan,	158	620	
	Genoa,	331	601	Paulms

Arras.

100 Els at Arras doe make at	London,	60	606	Elles.
	Antwerp,	101	010	
	Nuremberg,	105	555	
	Franckford,	126	262	
	Dantzick,	83	838	
	Viena,	87	878	
	Lions,	61	616	Aulnes.
	Paris,	57	575	
	Roan,	52	525	
	Sivill,	80	180	Vares.
	The Iles,	62	626	
	Venice,	109	090	Braces.
	Lucques,	121	212	
	Florence,	123	131	
	Millan,	139	394	
	Genoa,	291	414	Paulms

Ralph Adams

John Adams

Ambrose

John

Lions.

Lions.

100 Aulnes at Lions do make at

London,	98	362	Elles.
Antwerp,	163	934	
Nuremberg,	171	311	
Franckford,	204	918	
Dantzick,	136	065	
Vienna,	142	623	
Arras,	162	295	
Paris,	93	443	Aulnes.
Roan,	85	246	
Sivill,	132	791	Vares.
The Iles,	101	640	
Venice,	177	049	Braces.
Lucques.	196	721	
Florence,	200	819	
Millan,	226	229	
Genoa,	472	950	Paulms.

The agreement of measures at *Arras* with the measures at other places.

Paris.

100 Aulnes at Paris do make at

London,	105	263	Elles.
Antwerp,	175	439	
Nuremberg,	183	333	
Franckford,	219	298	
Dantzick,	145	615	
Vienna,	152	630	
Arras,	173	684	
Lions,	107	000	Aulnes.
Roan,	91	228	
Sivill,	142	105	Vares.
The Iles,	108	793	
Venice,	189	474	Braces.
Lucques,	210	526	
Florence,	214	911	
Millan,	242	105	
Genoa,	506	136	Paulms

Roan.

Roan.

100 Aulnes at Roan do make at	London,	115	384	Elles.
	Antwerp,	192	307	
	Nuremberg,	200	961	
	Franckford.	240	384	
	Dantzick,	159	615	
	Vienna,	167	307	
	Arras,	190	384	
	Lions,	117	307	Aulnes.
	Paris,	109	615	
	Sivill,	155	769	Vares.
	The Iles,	119	230	
	Venice,	207	592	Braces.
	Lucques,	230	768	
	Florence,	235	565	
	Millan,	265	384	
	Genoa,	554	807	Paulms.

Sivill.

100 Wares at Sivill do make at	London,	74	074	Elles.
	Antwerp,	123	457	
	Nuremberg,	129	012	
	Franckford,	154	321	
	Dantzick,	102	469	
	Vienna,	107	407	
	Arras,	122	222	
	Lions,	75	308	Aulnes.
	Paris,	70	370	
	Roan,	64	197	
	The Iles,	76	543	Wares.
	Venice,	133	333	Braces.
	Lucques,	148	148	
	Florence,	151	234	
	Millan,	170	370	
	Genoa.	356	174	Paulms.

The Iles of Madere.

100 Wares at the Ile of Madere doe make at	London.	96	772	Elles.
	Antwerp,	161	290	
	Nuremberg,	168	548	
	Franckford,	201	613	
	Dantzick,	133	871	
	Vienna,	140	322	
	Arras,	159	677	
	Lions,	98	387	Aulnes.
	Paris,	91	935	
	Roan,	83	871	
	Sivill,	130	645	Wares.
	Venice,	174	226	Braces.
	Lucques,	193	548	
	Florence,	197	903	
	Millan,	222	583	
	Genoa.	465	226	Paulms

Venice.

100 braces at Venice do make at

London,	55	555	Elles.
Antwerp,	92	542	
Nuremberg,	96	790	
Franckford,	115	741	
Dantzick,	76	853	
Vienna,	80	055	
Arras,	91	666	
Lions,	56	481	Aulnes.
Paris,	52	777	
Roan,	48	148	
Sivill,	75	000	Vares.
The Iles,	57	407	
Lucques,	111	111	Braces.
Florence,	113	426	
Millan,	127	777	
Genoa,	266	018	Paulms

Lucques.

100 Braces at Lucques doe make at

London,	50		Elles.
Antwerp,	83	333	
Nuremberg,	87	083	
Francktord,	104	166	
Dantzick,	69	166	
Vienna,	72	500	
Arras,	82	500	
Lions,	50	833	Aulnes.
Paris,	47	500	
Roan,	43	333	
Sivill,	67	500	Vares.
The Iles,	51	666	
Venice,	90	000	Braces.
Florence,	102	083	
Millan,	115	000	
Genoa.	240	416	Paulms

Florence.

One hundred Braces at Florence do make at	London,	48	979	Elles.
	Antwerp,	81	632	
	Nuremberg,	85	306	
	Franckford,	102	040	
	Dantzick,	67	755	
	Vienna,	71	020	
	Arras,	80	808	
	Lions,	49	796	Aulnes.
	Paris,	46	530	
	Roan,	42	449	
	Sivill,	66	122	Vares.
	The Iles,	50	612	
	Venice,	88	163	Braces.
	Lucques,	97	959	
	Millan,	112	653	
	Genoa.	235	510	Paulms

Millan.

100 braces at Millan do make at

London,	43	478	Elles.
Antwerp,	72	463	
Nuremberg,	75	724	
Franckford,	90	579	
Dantzick,	60	145	
Vienna,	63	043	
Arras,	70	174	
Lions,	44	202	Aulnes.
Paris,	41	217	
Roan,	37	680	
Sivill,	58	695	Vares.
The Iles,	44	926	
Venice,	78	260	Braces.
Lucques,	86	956	
Florence,	88	768	
Genoa.	209	058	Paulms.

The

The agreement of Waights of divers countries, the one with the other being reduced to an equality, and drawn into Tables as followeth.

London.

112 li. waight at London doe make at

Antwerp,	107	625
Lisbborne,	99	000
Noremberg,	100	500
Roan,	98	000
Lions,	118	500
Paris,	102	250
Diep,	100	250
Geneva,	90	375
Toulouse,	122	750
Rochell,	124	875
Marseilles,	124	250
Sivill,	109	750
Venice sut.	166	875
Venice gros.	105	375
Vienna,	89	375
Preslaw,	134	625
Leibzig,	101	250
Dantzick,	129	250
Lubeck,	97	375
Barcellone,	143	500
Genoa.	157	250

Nuremberg.

100 li. at Nuremberg makes at

London,	111	442
Antwerp,	107	089
Lisbborne,	98	508
Roan,	97	512
Lions,	117	910
Paris,	101	711
Diep,	99	751
Geneva,	89	927
Toulouse,	122	139
Rochel,	124	254
Marseilles,	123	632
Sivill,	109	204
Venice sut.	166	445
Venice gros.	104	850
Vienna,	88	930
Preslaw,	133	955
Leipzig,	100	746
Dantzick,	128	607
Lubeck,	96	890
Barcellone,	142	786
Genoa.	156	467

Roan.

Roan.

100 li. at Roan makes at	London,	114	285
	Antwerp,	109	821
	Lisbborne,	101	020
	Nuremberg,	102	551
	Lions,	120	918
	Paris,	104	336
	Diep,	102	296
	Geneva,	92	219
	Toulouse,	125	255
	Rochell,	127	423
	Marseilles,	126	796
	Sivill,	111	990
	Venice sut.	170	178
	Venice gros.	107	525
	Vienna,	91	199
	Breslaw,	137	347
	Leipzig,	103	316
	Dantzick,	131	898
	Lubeck,	99	362
	Barcellone,	146	530
	Genoa.	160	459

Lions.

Lions.

100 li. at Lions makes at	London,	95	063
	Antwerp,	90	823
	Lishborne,	83	544
	Nuremberg,	84	810
	Roan,	82	700
	Paris,	86	287
	Diep,	84	599
	Geneva,	76	265
	Toulouse,	103	586
	Rochell,	105	380
	Marseilles,	104	850
	Sivill,	92	616
	Venice sut.	140	823
	Venice gros.	88	928
	Vienna,	75	422
	Preslaw,	113	607
	Leipzick,	85	443
	Dantzick,	109	072
	Lubeck,	82	173
	Barcellone,	121	097
	Genoa.	132	700

Paris.

And Mees

Paris.

100 li. at Paris makes at

London,	109	535
Antwerp,	105	256
Lishborne,	96	821
Noremberg,	98	329
Roan,	95	843
Lions,	115	892
Diep,	98	044
Geneva,	88	386
Toulouse,	120	049
Rochell,	122	146
Marseilles,	121	515
Sivill,	107	334
Venice sut.	163	203
Venice gros.	103	056
Vienna,	87	408
Breslaw,	131	663
Leibzick,	99	022
Dantzick,	126	406
Lubeck,	95	232
Barcellone,	140	342
Genoa.	153	789

The 100 waight at *Collen* and *Ausburge*, is equall to the 100 waight at *Paris*.

Lions.

100 li. at Lions makes at

London,	95	063
Antwerp,	90	823
Lisbborne,	83	544
Nuremberg,	84	810
Roan,	82	700
Paris,	86	287
Diep,	84	599
Geneva,	76	265
Toulouse,	103	586
Rochell,	105	380
Marseilles,	104	850
Sivill,	92	616
Venice sut.	140	823
Venice gros.	88	928
Vienna,	75	422
Preslaw,	113	607
Leibzick,	85	443
Dantzick,	109	072
Lubeck,	82	173
Barcellone,	121	097
Genoa.	132	700

And Mees

Paris.

100 li. at Paris makes at			
	London,	109	535
	Antwerp,	105	256
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	Sivill,	107	334
	Venice sut.	163	203
	Venice gros.	103	056
	Vienna,	87	408
	Preslaw,	131	663
	Leibzick,	99	022
	Dantzick,	126	406
	Lubeck,	95	232
	Barcellone,	140	342
	Genoa.	153	789

The 100 waight at *Collen* and *Ausburge*, is equall to the 100 waight at *Paris*.

Diep.

100 li. at Diep makes at	London,	111	720
	Antwerp,	107	357
	Lisbborne,	98	753
	Naremberg,	100	249
	Roan,	97	755
	Lions,	118	204
	Paris,	101	995
	Geneva,	90	149
	Toulouse,	122	443
	Rochell,	124	563
	Marseilles,	123	940
	Sivill,	109	476
	Venice sut.	166	458
	Venice gros.	105	112
	Vienna,	89	152
	Preslaw,	134	288
	Leipzig,	100	997
	Dantzick,	128	927
	Lubeck,	97	132
	Barcellone,	143	042
	Genoa.	156	857

Geneva.

100 li. at Geneva makes at	London,	123	928
	Antwerp,	119	087
	Liſhbourne,	109	543
	Nuremberg,	111	092
	Roan,	108	437
	Lions,	131	123
	Paris,	113	138
	Diep,	110	926
	Toulouſe,	135	823
	Rochell,	138	174
	Marſeilles,	137	482
	Sivill,	121	438
	Venice ſut.	184	637
	Venice groſ.	116	597
	Vienna,	98	893
	Preſlaw,	148	962
	Leibzig,	112	028
	Dantzick,	143	015
	Lubeck,	107	745
	Barcellone,	158	782
	Genoa.	173	997

Toulouse.

100 li. at Toulouse makes at

London,	91	254
Antwerp,	87	678
Franckford,	80	651
Nuremberg,	81	875
Roan,	79	878
Lions,	96	537
Paris,	83	299
Diep,	81	670
Geneva,	73	625
Rochell,	101	730
Marseilles,	101	220
Sivill,	89	409
Venice sut.	135	947
Venice gros.	85	845
Vienna,	72	810
Preslaw,	109	674
Leipzick,	82	484
Dantzick,	105	295
Lubeck,	79	022
Barcellone,	116	904
Genoa,	128	106

Rochell,

Rochell.

100 li. at Rochell doe make at	London,	89	689
	Antwerp,	86	187
	Lishborne,	79	279
	Nuremberg,	80	480
	Roan,	78	478
	Lions,	94	895
	Paris,	81	882
	Diep,	80	280
	Geneva,	72	373
	Toulouse,	98	298
	Marseilles,	99	499
	Sivill,	87	888
	Venice sut.	133	638
	Venice gros.	84	380
	Vienna,	71	571
	Preslaw,	107	807
	Leibzick,	81	081
	Dantzick,	103	503
	Lubeck,	77	978
	Barcellone,	114	914
	Genoa,	125	925

Marseilles.

Marseilles.

100 li. at Marseilles makes at

London,	90	140
Antwerp,	86	627
Lishborne,	79	678
Nuremberg,	80	885
Roan,	78	873
Lions,	95	372
Paris,	82	293
Diep,	80	684
Geneva,	78	068
Toulouse,	98	712
Rochell,	100	502
Sivill,	88	322
Venice sut.	134	306
Venice gros.	84	809
Vienna,	71	931
Pressaw,	108	350
Leibzig,	81	489
Dantzick,	104	024
Lubeck,	78	370
Barcellone,	115	493
Genoa.	126	558

Sivill,

Sivill.

100 li. at Sivill makes at	London,	102	050
	Antwerp,	98	063
	Lisbborne,	90	205
	Nuremberg,	91	571
	Roan,	89	202
	Lions,	107	972
	Paris,	93	166
	Diep,	91	161
	Geneva,	82	346
	Toulouse,	111	845
	Rochell.	113	781
	Marseilles,	113	212
	Venice sut.	152	050
	Venice gros.	96	014
	Vienna,	81	435
	Preslaw,	122	665
	Leibzick,	92	255
	Dantzick,	117	767
	Lubeck,	88	724
	Barcellone,	130	751
	Genoa,	143	325

Venice suttle Waight.

100 li. at Venice suttle waight makes at	London,	67	115
	Antwerp,	64	494
	Lisbborne,	59	325
	Nuremberg,	60	224
	Roan,	58	726
	Lions,	71	011
	Paris,	61	274
	Diep,	60	074
	Geneva,	54	157
	Toulouse,	73	558
	Rochell,	74	831
	Marseilles,	74	457
	Sivill,	65	768
	Venice gros.	63	146
	Vienna,	53	558
	Preslaw,	80	674
	Leibzig,	60	674
	Dantzick,	77	453
	Lubeck,	52	299
	Barcellone.	85	992
	Genoa.	94	232

Venice grosse Waight.

100 li.at Venice grosse waight makes at

London,	106	287
Antwerp,	102	135
Lishborne,	93	950
Nuremberg,	95	373
Roan,	93	001
Lions,	112	465
Paris.	97	034
Diep,	95	136
Geneva,	85	765
Toulouse,	116	489
Rochell,	118	505
Marseilles,	117	912
Sivill,	104	151
Venice sut.	158	363
Vienna,	84	816
Breslaw,	127	758
Leibzick,	96	085
Dantzick,	122	742
Lubeck,	92	408
Barcellone,	126	275
Geñoa.	149	229

Vienna.

100 li. at Vienna makes at

London,	125	315
Antwerp,	120	420
Liſhborne,	110	769
Nuremberg,	112	447
Roan,	109	650
Lions,	132	598
Paris,	114	405
Diep,	112	168
Geneva,	101	118
Toulouſe,	137	343
Rochell,	139	720
Marſeilles,	139	021
Sivill,	122	797
Venice ſut.	186	712
Venice groſ.	117	902
Preſlaw,	150	629
Leibzick,	113	286
Dantzick,	144	615
Lubeck,	108	951
Barcellone,	160	559
Genoa,	175	943

Preslaw.

100 li. at Preslaw makesat	London,	83	195
	Antwerp,	79	944
	Lishborne,	73	537
	Nuremberg,	74	652
	Roan,	72	795
	Lions,	88	022
	Paris,	95	951
	Diep,	74	466
	Geneva,	67	131
	Toulouse,	91	179
	Rochell,	92	757
	Marseilles,	92	220
	Sivill,	81	522
	Venice sut.	123	955
	Venice gros.	78	273
	Vienna,	66	388
	Leibzick,	75	209
	Dantzick,	96	007
	Lubeck,	72	330
	Barcellone,	106	592
	Genoa.	116	805

Leibzig.

100 li. at Leibzig, makes at	London,	110	617
	Antwerp,	106	296
	Lishborn,	97	788
	Nuremberg,	99	259
	Roan,	96	790
	Lions,	116	938
	Paris,	100	987
	Diep,	99	012
	Geneva,	89	259
	Toulouse,	121	234
	Rochell,	123	333
	Marseilles,	122	716
	Sivill,	108	395
	Venice sut.	164	814
	Venice gros.	104	074
	Vienna,	88	272
	Preslaw,	132	963
	Dantzick,	127	654
	Lubeck,	96	172
	Barcellone,	141	827
	Genoa.	155	308

Dantzick,

Dantzick.

100 li. at Dantzick makes at	London,	86	653
	Antwerp,	83	268
	Lishborne,	76	595
	Nuremberg,	77	756
	Roan,	75	822
	Lions,	91	683
	Paris,	79	110
	Diep,	77	563
	Geneva,	69	922
	Toulouse,	94	971
	Rochell,	96	615
	Marseilles,	96	131
	Sivill,	84	913
	Venice sut.	129	110
	Venice gros.	81	520
	Vienna,	69	148
	Preslaw,	104	158
	Leibzig,	78	336
	Lubeck,	75	337
	Barcellone,	111	025
	Genoa.	121	663

Lubeck.

100 li. at Lubeck makes at	London,	115	019
	Antwerp,	110	526
	Lishborn,	101	667
	Nuremberg,	103	209
	Roan,	100	642
	Lions,	121	694
	Paris,	105	006
	Diep,	102	952
	Geneva,	92	811
	Toulouse,	126	059
	Rochell,	128	241
	Marseilles,	127	609
	Sivill,	112	708
	Venice sut.	171	373
	Venice gros.	108	215
	Vienna,	91	784
	Preslaw,	138	254
	Leibzig,	103	979
	Dantzick,	132	734
	Barcellone,	147	368
	Genoa,	161	489

Barcellone.

Barcellone.

100 li. at Barcellone makes at	London,	78	048
	Antwerp,	75	000
	Lisbborn,	68	989
	Nuremberg,	70	061
	Roan,	68	290
	Lions,	82	578
	Paris,	71	254
	Diep,	69	860
	Geneva,	62	979
	Toulouse,	85	540
	Rochell,	87	021
	Marseilles,	86	585
	Sivill,	76	480
	Venice sut.	116	149
	Venice gros.	73	432
	Vienna,	62	282
	Preslaw,	93	118
	Leibzig,	70	557
	Dantzick,	90	061
	Lubeck.	67	857
	Genoa.	109	581

Genoa.

100 li. at Genoa makes at	London,	71	224
	Antwerp,	68	442
	Lishborne,	62	957
	Nuremberg,	63	910
	Roan,	62	320
	Lions,	75	357
	Paris,	65	023
	Diep,	63	752
	Geneva,	57	478
	Toulouse,	78	060
	Rochell,	79	411
	Marseilles,	79	014
	Sivill,	69	793
	Venice sut.	106	121
	Venice gros.	67	011
	Vienna,	56	836
	Preslaw,	85	612
	Leibzig,	64	388
	Dantzick,	82	194
	Lubeck,	61	923
	Barcellone.	91	272

The 100 waight at *Aquila* is equall to the 100 waight at *Genoa*.

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Genoa.

100 lt. at Genoa makes at	London,	71	224
	Antwerp,	68	442
	Lishborne,	62	957
	Nuremberg,	63	910
	Roan,	62	320
	Lions,	75	357
	Paris,	65	023
	Diep,	63	752
	Geneva,	57	478
	Toulouse,	78	060
	Rochell,	79	411
	Marseilles,	79	014
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	Venice sut.	106	121
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	Preslaw,	85	612
	Leibzig,	64	388
	Dantzick,	82	194
	Lubeck,	61	923
	Barcellone.	91	272

The 100 waight at *Aquila* is equall to the 100 waight at *Genoa*.

Here